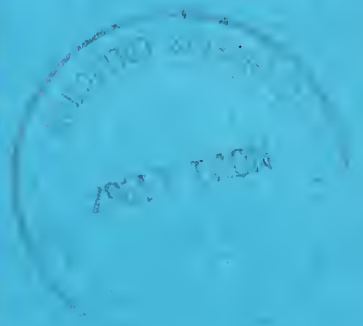


# TAIWAN

A MARKET FOR U.S. PRODUCTS



A SUPPLEMENT TO

*International  
Commerce*

U.S. DEPARTMENT OF COMMERCE / Bureau of International Commerce

A SUPPLEMENT TO

***International  
Commerce***

... the weekly news magazine for world traders published by the Bureau of International Commerce and sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, and by Department of Commerce Field Offices for \$16 a year.

A  
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in  
**TAIWAN**

A U. S. DEPARTMENT OF COMMERCE PUBLICATION



U.S. DEPARTMENT OF COMMERCE

Alexander B. Trowbridge  
Secretary

Lawrence C. McQuade  
Assistant Secretary for Domestic  
and International Business

BUREAU OF INTERNATIONAL COMMERCE

Lawrence A. Fox  
Director

*By*  
**Maurice Kogon**  
**Bureau of International Commerce**  
**U.S. Department of Commerce**

Mr. Kogon, currently Philippine Desk Officer in the Far Eastern Division, was Taiwan Desk Officer at the time this survey was conducted. He developed much of the information for this survey during his recent trip to all key commercial, industrial and rural areas in Taiwan, and in plant inspections and interviews with local businessmen and officials. He also drew upon reports prepared by the American Embassy in Taipei and on articles in official and unofficial local publications.

Oliver B. Bongard, Commercial Attache, and Natale Bellocchi, Commercial Officer, U.S. Embassy, Taipei, provided valuable assistance and advice. This market survey was prepared under the direction of Eugene J. Kaplan, Director, Far Eastern Division.

Photographs obtained from the Council for International Economic Cooperation and Development (CIECD).

## FOREWORD


U.S. exporters frequently by-pass the developing countries in planning their overseas marketing operations. They often do so without adequately assessing the potential of these markets, losing much export business by default to less timid suppliers.

The Republic of China, Taiwan, is a prime example of a fast-developing market overlooked by many American exporters. Those already active there can attest to past rewards and future profit potential. Taiwan's imports from the U.S. from 1960 through 1966 nearly doubled to a peak \$193 million, giving us a 32% share of the market in 1966. Taiwan's rapid economic expansion will continue to generate valuable export opportunities, particularly for industrial materials and equipment. This could mean substantially greater U.S. sales in the years ahead if more of our manufacturers and exporters enter that market and are prepared to make a sustained sales effort there.

This survey is designed to help American industry assess the potential for products in Taiwan and formulate a marketing strategy most responsive to local competitive conditions and practices.

Lawrence A. Fox  
Director  
Bureau of International Commerce

**OCTOBER 1967**



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# Introduction

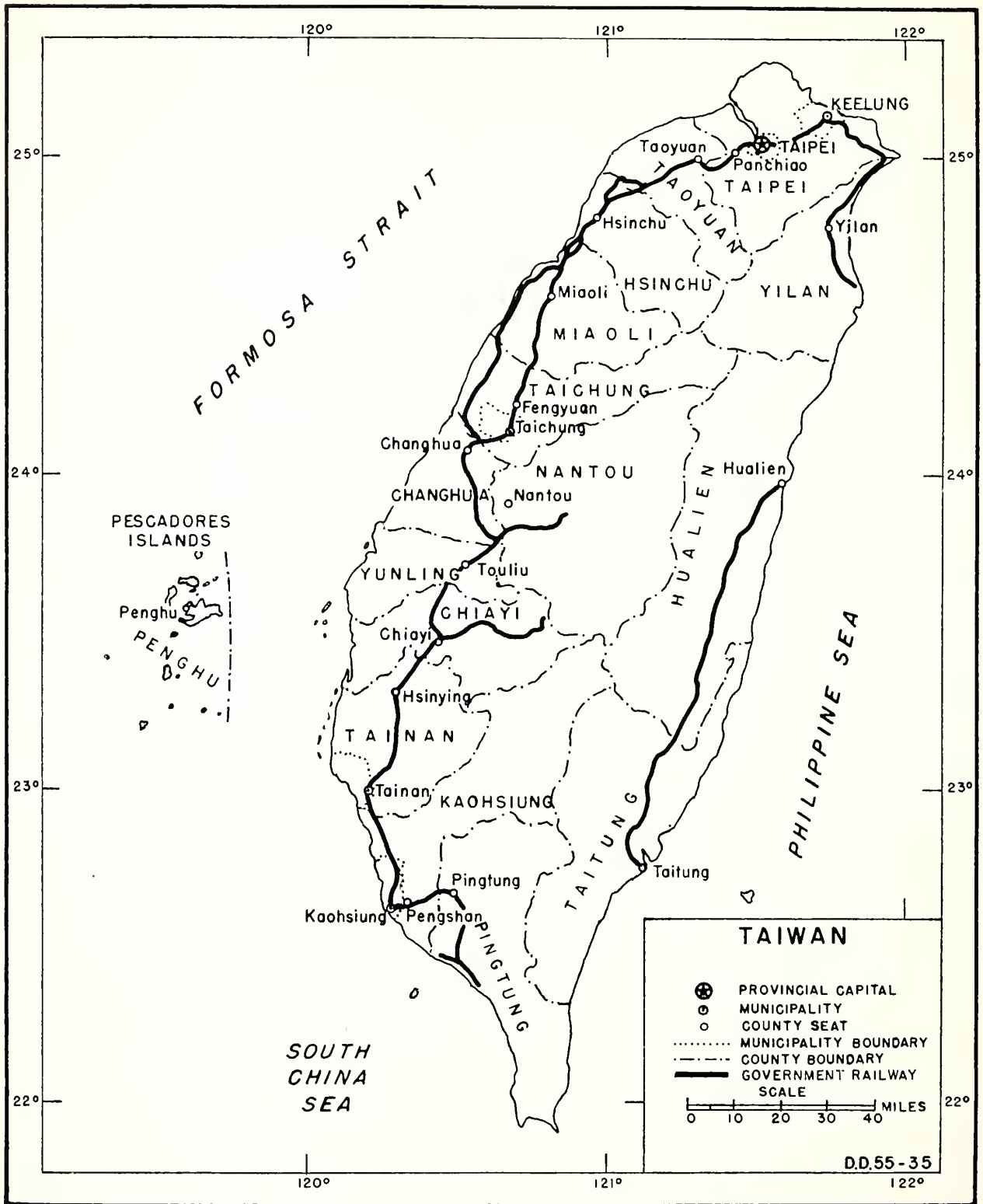
Taiwan's market offers great promise to the U.S. supplier. The economy is healthy and taking off, incomes are rising, industry is booming, and foreign trade is expanding beyond all expectations. Without a doubt Taiwan will be one of Asia's important manufacturing and distribution centers in five years.

This growth will exert a powerful, stimulating effect on imports. U.S. suppliers have benefited from Taiwan's past development and, with the proper marketing approach, should continue to benefit from its future economic expansion. During the 12 years (1953-64) covered by the island's first 3 Four Year Development Plans, Taiwan imported a total of \$3,193 million worth of goods, of which the United States supplied \$1,321 million or 41.4 percent—more than any other supplier. Despite this impressive performance relatively few American firms actively participated and those who did were mainly reaping the fruits of the U.S. aid program which financed 31.5 percent of total imports (\$1,007 million) and 50 percent of all imports from the United States (\$666.6 million). With the AID program now terminated, U.S. exporters are in a relatively weaker position. Not enough U.S. firms are represented, and fewer

still appear prepared to make the critical transition to an openly competitive market. U.S. firms who are not in the Taiwan market should get established there promptly; those already in would be well advised to develop a more competitive outlook and push hard or foreclose on a bright future.

This report, designed for new as well as the established U.S. exporters to Taiwan, identifies and describes as fully as possible the best areas of export opportunity for the next several years, and indicates the most effective methods for exploiting those opportunities within the framework of competition and trading practices characteristic of the country.

It will name those products needed in Taiwan which U.S. suppliers can sell competitively but are not always doing so; those which only U.S. suppliers can supply competitively; and those which U.S. suppliers cannot provide at all or cannot export competitively. It will also analyze demand trends and factors in the main buying sectors, identify the principal competitors and evaluate their sales techniques, and suggest ways for improving the U.S. supplier's competitive effort through more effective pricing, credit, servicing, delivery, distribution, and other marketing approaches.



# Overall Economy and Market

## ***ECONOMIC TRENDS AND OUTLOOK***

Taiwan has enjoyed rapid economic expansion in recent years. The population has grown by 3 percent since 1957, while real gross national product (GNP) has expanded at the rate of 6-8 percent, real per capita income at 4 percent, industrial production 13 percent, and agricultural production 6 percent. By 1965 GNP and per capita income reached an estimated \$2.75 billion and 174 dollars, respectively.

Present signs suggest even greater economic growth in the future. The country's infrastructure is sound and able to support rising industrial activity. The climate for doing business is steadily improving. The chronic threat of inflation is under control. Production levels are at all time highs in nearly every existing industry. There is ample room for development of new industries. Domestic purchasing power and internal demand for local products are increasing. Export markets have yet to be fully tapped. Foreign exchange reserves are increasing. New foreign investment is up sharply, and the Government is expanding its programs to encourage industrial and agricultural development. These favorable conditions should offset the island's main economic problems: Overpopulation, high unemployment and underemployment, inadequate managerial and technical know-how, and the high cost of borrowed capital (12 to 17 percent a year).

The island's rapid economic growth up to 1964 was made possible by the infusion of over \$1.3 billion in U.S. AID funds and supplies, \$60.5 million in pri-

vate foreign capital, and a total local capital investment of about \$3.2 billion, all coordinated in three Four Year Economic Development Plans covering the years 1953-64. These massive investments went toward the development of an infrastructure (power, transport, and communications facilities) second only to Japan in Asia, and helped to increase per capita income, purchasing power, and consumer expectation levels to among the highest in Asia. In turn, these improved conditions enhanced the climate for industrial activity and enabled local producers to rely more on the domestic market to absorb the increased output. In short, by 1964 Taiwan had reached the point of "take-off" into self-sustaining growth, with further rapid industrial growth virtually assured.

Having reached this critical stage of economic development, Taiwan no longer required concessional foreign assistance after 1964 and could begin to afford foreign loans on normal commercial terms. Thus the U.S. AID program was officially terminated on June 30, 1965. Henceforth, Taiwan's external capital inputs will come mainly from the World Bank, the various foreign Export-Import Banks, other lending institutions, and foreign investors.

The projected rate and extent of economic development over the four years 1965-68 is outlined in the current and fourth Four-Year Plan. The Plan calls generally for an annual real growth rate of 7 percent for GNP and national income and 4.1 percent for per capita income, and annual increases in agricultural and industrial production of 4 percent and 11 percent,

respectively. Services are to expand by 5.7 percent a year. By 1968, GNP should reach nearly \$3.4 billion, national income \$2.8 billion, and per capita income \$196. Gross capital formation will be increased by 10.7 percent a year from \$483 million to \$725 million in the period. In that time, exports and imports are to be increased by 10 percent and 9 percent a year to roughly \$620 million and \$680 million, respectively. These are conservative estimates which could be surpassed if present growth rates continue.

An estimated \$2.2 billion investment will be made over the 4 years to implement the Plan. Roughly 46 percent (\$1.01 billion) will go to the industrial sector, 12 percent (\$268 million) for transport and communications projects; 14 percent (\$314 million) for agricultural development, and 28 percent (\$629 million) to other fields.

Aside from the capital inputs, various legislative and administrative programs of the Government will also help to promote economic development. These include tax incentives; creation of industrial estates; provision of low-cost land for industrial sites; passage of liberal foreign investment legislation to encourage private foreign investment; special assistance to small and medium industries in the form of loans, technical advice, quality-control guidance and marketing information; installment payment and rebate of import duties; selective waivers of import controls; and establishment of an export processing zone in Kaohsiung which will permit duty free entry of raw materials and equipment by the factories located there.

As can be seen from the Government's economic incentive programs and measures and the projected investment allocations under the new Four-Year Plan, the main thrust over the next several years will be to advance the pace of industrialization. The Government will emphasize in order of priority, heavy and more sophisticated industries, export processing industries, industries utilizing local raw materials, and labor intensive industries.

Rapid industrial progress is already the salient feature of the economy. Industry's contribution to the net Domestic Product (NDP) which totaled \$2,263 million in 1965 rose from 21.1 percent in 1960 (\$253 million) to 23.3 percent in 1965 (\$527 million). This compares with 26.7 percent in 1965 for agriculture, 15.4 percent for commerce, 4.0 percent for construction, 4.4 percent for transportation and communication, and 26.2 percent for all others. Within the industrial sector, in 1965 manufacturing alone accounted for 19.5 percent of NDP or \$442 million, an increase of 92 percent above the 1960 level of \$230 million. Mining and utilities (power and water supply) contributed 2 percent and 1.8 percent, respectively.

The annual increase in industrial output averaged 14.8 percent between 1960 and 1965. The value of

overall industrial production increased in the period by 97 percent, from \$751 million to \$1,476 million; manufacturing output rose by 98 percent, from \$663 million to \$1,314 million. Taiwan's great industrial progress in recent years is also reflected in the increased number of registered factories and in the growth of industrial exports. Factory registration rose 57 percent, from 18,788 to 29,573 while industrial exports increased 129 percent, from \$147 million to \$336 million.

### **IMPORT PATTERNS**

Although Taiwan is poorly endowed in natural resources, it is nevertheless pursuing a vigorous industrialization program. In this process, imports have had to be substantial and steady. To feed rising domestic production, most of the required raw materials and capital equipment have had to be imported. To construct the Island's basic infrastructure, nearly all the required power generating, telecommunications, transport and construction equipment have had to be imported. To keep the farmlands fertile and productive, most of the required fertilizers, insecticides, and irrigation and flood control equipment have had to be imported. The only items which have not been imported in quantity are food products (other than wheat and soybean) which are locally grown in abundance and nonessential consumer goods which are controlled for domestic austerity purposes and to save foreign exchange.

To meet these demands, imports have increased rapidly in recent years and further growth is expected. In the 5-year period 1960-65, they rose by \$300 million or 120 percent to \$555 million, while in just 2 years from 1963 to 1965 they increased by 65 percent or \$220 million. Since 1960, import increases have averaged \$50 million, or 17 percent each year. Although a lesser rate of increase is probable over the next 2 years because of accumulated inventories, imports should again pick up briskly after 1968. By that year total imports are expected to reach the \$680 million level.

Industrial imports have increased more rapidly than other categories because so much of the import expansion was in response to industrial growth—particularly the development of export processing industries utilizing imported raw materials, components and machinery. Thus, while total imports rose by 120 percent in 1960-65, raw material imports increased by 136 percent to \$299 million and capital goods by 185 percent to \$159 million. On the other hand, food and consumer goods imports rose by only 70 percent to \$97 million, of which foods alone accounted for two-thirds.

Taiwan's principal industrial imports include base metals, machinery and tools, vehicles and vessels, raw

cotton, electrical materials, crude oil, chemicals, man-made fibers, logs, chemical fertilizers, oil, grease and wax, raw wool, and synthetic resins. Major food and consumer imports include wheat, soybean, powdered milk, and pharmaceuticals (Table 16, Appendix C).

The United States and Japan have benefited more than other countries from Taiwan's rising import demand. The two countries combined account for more than 70 percent of Taiwan's total imports each year, the United States taking 34 percent and Japan 37 percent in 1965. West Germany, the only other heavy competitor in a broad range of products, had only 4 percent of the market in 1965. German competition is confined mainly to specific kinds of machinery, vehicles, chemicals, dyestuffs, and pharmaceuticals. There are, of course, other suppliers who either dominate or count heavily in the sale of one or two products each, for example crude oil from the Middle East; raw wool from Australia; logs from the Philippines; metallic ores, crude rubber, and hides and skins from Southeast Asia; pharmaceuticals from Italy and Switzerland; dairy products from the Netherlands; and paper products from Scandinavia. The United States and Japan, however, are the foremost competitors covering the broadest range of significant imports.

The United States is the principal supplier of raw cotton, wheat, soybean, edible oils, wood pulp, scrap iron and steel, tobacco leaf, potassium fertilizer, oils and greases, and synthetic rubber. Against strong Japanese and other competition, U.S. suppliers also have done well in the sale of chemicals, pharmaceuticals, synthetic resins, and scientific instruments. Yet, while U.S. suppliers in 1965 enjoyed a sizable \$67 million sales volume of machinery and tools, vehicles, vessels and parts, ores, metals and manufactures, and electrical materials, Japanese exporters of these products supplied twice that amount during the period. Japan is also the principal supplier of synthetic fibers, nitrogenous fertilizer, and photographic apparatus among Taiwan's other high-volume imports (Table 16, Appendix C).

### **MARKET FACTORS**

There are four main buying sectors in Taiwan—manufacturing, agricultural, service, and consumer. These will be discussed later in terms of growth trends, consumption needs, the economy's ability to fill these needs, degree and nature of reliance on imports, and prospects for increased sales of U.S. products.

The manufacturing sector is by far the most important. The island has few industrial resources and little production of industrial machinery, so this sector relies heavily on imports. In 1965, it took about \$390 million worth, or 70 percent of total imports,

in the form of industrial raw materials and machinery and equipment. Taiwan has some 38 principal manufacturing industries, most of them either large and highly developed or young and rapidly expanding. Few are stagnant. The industrial economy is clearly advancing very fast and should continue to be the leading buyer of imported products.

The agricultural sector remains a dominant force in the economy, but its consumption needs are less substantial than manufacturing. It already provides many of the basic foods and related products absorbed by the manufacturing and consumer sectors. Its only large requirements are farm implements and machinery to till the soil, irrigation facilities and fertilizer to keep the soil productive, and chemicals to protect the soil. More and more of these items are being produced locally, and over the long term demand for them will probably decline. This sector consumed \$24 million worth of imports in 1965, or 4.3 percent of the total, and the annual rate will probably be maintained for at least several years.

The service sector is steadily gaining in importance as a purchaser of goods. With rapid population growth and rising prosperity, the demand for such key economic services as transportation, communications, housing, health, and education is bound to increase. The basic service industries need plant and equipment of a heavy, sophisticated, or scientific and technological nature, which few developing countries are able to supply from local sources. Hence, this sector, like Taiwan's manufacturing sector, depends on ever-growing imports. In 1965 this sector accounted for \$54 million, or about 9 percent of total imports.

The needs of Taiwan's consumers, who are becoming more numerous and affluent, are being met locally by the largely consumer-oriented industrial and agricultural plant. Opportunities for developing the consumer market are further limited by tight controls necessarily imposed by a developing economy on imports of all but essential consumer goods. Total consumer goods imports in 1965 were valued at \$89 million, or 17 percent of the total, of which \$73 million comprised essential foods and medicines. Luxury consumer imports amounted to less than \$16 million, or 3 percent of the total.

Competition for the growing Taiwan market is extremely keen. For a number of years U.S. suppliers had not had to campaign strenuously because of the opportunities provided by the large U.S. aid program to Taiwan. However, since 1966 the proportion and value of Taiwan's imports financed with U.S. assistance has begun to fall off sharply, while imports purchased commercially with Taiwan's own foreign exchange have increased substantially. During the 4-year period 1960-64, about one-third of the island's total imports were aid-financed under a procedure

which tied nearly all procurement to U.S. sources. Thus, during the operation of the aid program, U.S. suppliers enjoyed about a 30 percent share of the total market completely free of third-country competition. Of the remaining 70 percent of total imports which were purchased under competitive conditions, the U.S. share averaged only about 25 percent a year, for an overall share of about 45 percent of Taiwan's total imports a year.

When the aid program terminated in 1965, the proportion of commercially financed imports rose from \$334 million to \$453 million, nearly 90 percent of total imports. While U.S. sales to this larger commercially financed market also increased, the proportionate share of these imports fell from 25 percent in 1964 to about 22 percent in 1965.

Despite the phase-out of U.S. aid, American exporters can still do very well in the Taiwan market on their own initiative. The commercial ties and arrangements forged while the aid program was still in effect certainly will have some carryover value for future sales. As a result of these ties, at least half of the imports heretofore obtained through AID financing should continue to come from U.S. sources. Whether U.S. exporters will be successful in keeping the remaining segment of the formerly aid-financed imports and in making further gains in the commercially financed sector will depend heavily on their sales enterprise.

The U.S. share of the market will probably fall below the usual 45 percent, but U.S. suppliers can reasonably expect at least a 25-30 percent overall share of the market in the long run.

Sales methods and practices in Taiwan are rather cut-and-dried. Credit transactions are discouraged by the Government's advance import payment requirement. Thus, most imports are financed by irrevocable letter of credit (L/C). Long-term supplier credits are not permitted unless specifically approved by the Government on a case-by-case basis. Short-term credits (up to 180 days) are possible on a delayed or usance L/C basis, but this procedure has not yet become widely used. This situation, of course, eases the burden on suppliers who would normally prefer not to extend credit unless forced to do so by credit-minded competitors. However, as discussed further in Chapters Two and Four, there are occasions when credit may be indispensable to a particular sale, and it is not wise to be inflexible in this regard.

Distribution practices in Taiwan are also confining. Most imported goods are bought direct by private end users (e.g., manufacturers) with or without a local commission agent, or by Government purchasing agencies (Central Trust of China or the Taiwan Supply Bureau) in behalf of Government corporations and agencies. General traders and distributors importing and selling for their own account are few in number. The main reasons for the lack of such commercial middlemen are (1) the Government requirement that controlled (i.e., restricted) imports may be imported only by end users, (2) the large number of Government corporations whose import procurement may be handled only by the Central Trust of China (CTC) or the Taiwan Supply Bureau (TSB), and (3) the high cost of money which discourages accumulation of inventories for display and resale.

# Import and Distribution: Regulations and Practices

Taiwan's import policy, though ultimately committed to freer trade, is presently burdened with restrictive regulations. These restrictions are deemed necessary by the Chinese Government to balance

Taiwan's international payments. Moreover, a large number of procedures and government agencies can often be involved in a simple business transaction. Once an American businessman learns the ropes, however, he can cope with many of the apparent obstacles more easily. Despite restrictions and red tape, Taiwan is importing more and more, and its market is becoming large enough and profitable enough to warrant tolerating the inconveniences. The Government is also making a determined effort to liberalize restrictions and improve procedures. Even now, it is probably easier to do business in Taiwan than in any other developing country. If American suppliers make the effort, they will find doing business in Taiwan both feasible and profitable.

## IMPORT CONTROLS

Imports are controlled through import licensing and, to a lesser extent, import duties. At present, import licenses are required for all imports. For licensing purposes, commodities are classified in three lists—the permissible, the controlled, and the prohibited.

Import licenses for items on the permissible list are granted automatically with no limit on quantity. Any registered trader, manufacturer, or other importer is eligible to import them. In general, permissible imports include most of the industrial raw materials and capital goods which are not available locally in suitable quality or price. Also included are some essential consumer goods not available locally, and some essential and less essential goods which are locally available but can withstand import competition. The trend is

*Chapter Two of this report summarizes salient Taiwan Government regulations affecting payment, distribution, and other trading practices; it discusses customary sales practices and suggests ways to use them to best advantage.*

*Chapter Three describes the various marketing aids and services available in Taiwan for promoting sales. These include banking, insurance, warehousing, advertising, marketing, consulting, and commercial intelligence. In general, Taiwan lacks the facilities to provide such services efficiently. Therefore, U.S. firms may find it worthwhile to set up branches or independent agencies in Taiwan to provide basic commercial services, while U.S. suppliers in need of such services may find it necessary to draw upon facilities in the United States. To that end, the many commercial services offered by the U.S. Department of Commerce at its 42 field offices and in Washington, D.C., are also listed.*

*Chapter Four analyzes in depth the competition which U.S. suppliers face in Taiwan, and suggests techniques that can be used in dealing with it.*

toward greater liberalization of controls and broadening of the permissible list.

On the controlled list there are still some 500 items. They fall mainly into three groups: (1) essential and unessential items which are produced locally but require protection against imports;<sup>1</sup> (2) unessential items, whether or not locally produced, which are restricted mainly to conserve foreign exchange; and (3) essential items which only government trading agencies may import. Private traders are precluded from importing any controlled items. Private and government end users (manufacturers, hospitals, public utilities, etc.) may import items in group 1 if a need is demonstrated, if the local product is inadequate for the specific need, or if its cost is at least 15 percent higher than the landed cost of the imported product. If government owned end users import them, procurement must be handled by government trading agencies. Group 2 items, mainly consumer goods, are nearly impossible to import so long as they remain on the controlled list, but they are more likely to be decontrolled as the foreign exchange position improves. Group 3 items are imported by the government trading agencies for their own account. They consist mostly of certain heavily imported basic foods and industrial materials which require some form of stabilizing influence to prevent market disruptions and wide price fluctuations.

Items on the prohibited list, mainly contraband and a few luxury goods, are not importable except by the Government for special purposes.

All import licenses, whether for permissible or controlled items, must be approved by the Foreign Exchange and Trade Commission (FETC). Eligible importers may apply to FETC for an import permit through any of the 11 foreign exchange banks in Taiwan. If the application is approved the import permit is issued, which automatically entitles the importer to the necessary foreign exchange.

In addition to import permits, certain commodities require special documents or procedures for import purposes. Such commodities and the pertinent documents or procedures involved are listed in Appendix D.

Taiwan's import tariff system, revised in 1965, is geared to product essentiality and local availability. In general, tariff rates for industrial raw materials excluding machinery and equipment are lower than those for semifinished products, and those for semifinished products are lower than those for finished manufactures, such as consumer goods. Within this

framework, tariffs are lowest for essential and unavailable items (nil to 10 percent ad valorem); fairly low for essential but available items (10 to 25 percent); fairly high for unessential, unavailable items (25 to 50 percent); and highest for unessential, available items (50 to 100 percent). Duties on production machinery run from about 7.5 to 25 percent, with most in the 10 to 15 percent range.

Agricultural products readily available in Taiwan face rather high duties—ranging from 40 to 60 percent. Duties on essential foods not available locally are much lower, averaging 5 to 15 percent. The latter duties also apply to most agricultural raw materials, for example seeds, fertilizers, and insecticides.

Tariffs are low also for educational materials and items for medical use, ranging from nil to about 15 percent. However, on finished pharmaceuticals produced locally, the duties average about 25 percent.

Samples and other advertising materials are subject to customs examination; but those of no commercial value (under \$25) are admitted duty free. Those having commercial value—pens, pencils, calendars, and miniature packages of tooth paste—are dutiable under the appropriate tariff classifications. Care should be taken to send advertising materials early, since customs classification and clearance of such articles often take considerable time.

Value for duty purposes is determined in either of two ways. If the wholesale value (in Taiwan) of the product is known, the following formula applies: dutiable value =  $\frac{\text{wholesale market value}}{1 + \text{duty rate} + 0.14}$ . If not known, then dutiable value is the c.i.f. price plus 20 percent.

In addition to the basic ad valorem duty rates, two different surcharges are imposed on all imports: a 3 percent ad valorem harbor due and a defense surtax of 20 percent of the assessed duty. (The Government is considering abolishing the defense surtax.)

For example, the basic duty on a wristwatch is 15 percent ad valorem. If the wholesale value of the watch is \$20, then the duty paying value is  $\frac{\$20}{1 + 0.15 + 0.14}$  or \$15.50, and the assessed duty would be \$2.33. Adding the 3 percent ad valorem harbor due (\$0.47) and 20 percent of the assessed duty for the defense surtax (\$0.47), then the total import tax on the watch is \$3.27.

From time to time, as the Government decontrols certain items or puts others, including permissible ones, on the controlled list, these changes are announced in *International Commerce* magazine, published weekly by the Bureau of International Commerce. Duty rates are not changed on an ad hoc basis, but must await a general revision of the entire rate structure. This was last done in August 1965. For restrictions and duties on special items, see also the

<sup>1</sup>In 1964, the government toughened the criteria for obtaining protection against imports. Under the new regulations, no local product is eligible for protection unless (1) its price is within 15 percent (previously 25 percent) of the landed cost (c.i.f. cost, plus import duty and surtax of the competing imports); (2) its quality is adequate for local needs; and (3) the import value of the competing import exceeds \$30,000 per year. The control period is limited to 3 years (previously no limit).





**MAJOR FUNNEL FOR IMPORTS:** Keelung Harbor at northern tip of Taiwan is one of island's three international ports. Others are Kaohsiung in the south and Hualien on the east coast.

product analyses in Chapters 5 to 8. For additional information on specific duties and restrictions, contact the Far Eastern Division, Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C.

### ***LABELING AND MARKING***

There are no specific regulations governing the labeling of goods imported into Taiwan, although it is recommended that labels on containers of prepared foods and pharmaceuticals show a quantitative analysis of the contents. The rules governing the marking and numbering of foreign import cargo are as follows:

All import cargo must bear a mark of distinctive design, a set of three or more letters, or a combination of design and letters indelibly painted, stenciled, stamped, or burned on the packing or on the cargo itself.

For cargo packed in cases, boxes, crates, casks, drums, or cylinders, each container should bear a separate number which is not repeated during a period of 2 years. Bags or bales also must bear a nonrecurring number, date, or set of three or more letters.

In addition to the above marks, each package of a consignment must be numbered consecutively. However, numbering is not essential for large lots of cargo except when packed in cases, boxes, or crates, provided that each package of the consignment contains cargo of identical weight.

### ***SHIPPING DOCUMENTS***

Documents required for shipments to Taiwan include the consular invoice, commercial invoice, bill of lading or air waybill, packing list, and, for certain products, certificate of origin. Shipments of agricul-

tural products, plants, animals, and used articles such as old clothing may require special documents. The importer may request an independent survey at the port of export and a surveyor's certificate stating that the goods meet the specifications of the order.

### **WHO MAY IMPORT**

Taiwan offers three basic types of direct importers or distribution channels—private traders (importer-wholesalers who buy and sell for their own account), end users (manufacturers, public utilities, hospitals, schools, etc.), and Government trading agencies (Central Trust of China and Taiwan Supply Bureau). Any of these may import direct or through local Taiwan commission agents appointed by the supplier. In practice, except in the case of a few general commodities and spare parts, very little business is done by private traders. While Taiwan has over 2,300 such registered traders, almost all are poorly capitalized, in fact financially incapable of buying or selling in quantity for their own account and of maintaining stock for demonstration and resale purposes.

In order to obtain registration as a trader, a firm need have paid-in capital of only \$5,000 and an export or import record as a commission agent of \$50,000 and \$100,000, respectively, during the preceding 2 years. Only 46 traders in Taiwan are known to have capital of more than \$125,000 while 119 are capitalized between \$25,000 and \$125,000. Over 50 percent of the traders in Taiwan are capitalized under \$7,500.

Moreover, private traders are precluded from importing any items on the controlled list, and they are often unable to get government approval to import on deferred payment terms. Except for industrial raw materials, traders must pay by letter of credit (L/C), payable within 14 days after the import license is granted. For raw materials, payment on documents against payment (D/P) or consignment terms are allowed, provided FETC approves and the supplier is willing to sell on such terms. Thus, most of Taiwan's registered traders do a limited business for their own account and operate primarily as local commission agents of foreign suppliers.

Probably more than half of all sales are made direct to industrial end users, even though they may only buy for their own consumption (e.g., raw materials and machinery and equipment for specific purposes). They cannot buy general commodities for resale. They can buy any item on the permissible list for specific purposes, as well as items on the controlled list if prior FETC approval is obtained. They can also buy on a short term (60 to 180 days) credit basis, either documents against acceptance (D/A) or D/P terms, or, in the case of heavy machinery, on a long term installment basis, again if FETC approves in advance. They usually have adequate storage facilities

and can buy in bulk.

Purchases by government agencies and government-owned corporations account for about 23 percent of all imports financed with government foreign exchange. At the beginning of each fiscal year, every government organization must file a detailed estimate of its import needs for that year. If approved, the necessary foreign exchange is set aside for allocation at the appropriate time. Approval is granted on two conditions—(1) if the proposed import is not available locally in adequate quantity or quality, and (2) if available locally, the domestic price is at least 15 percent higher than the landed cost (c.i.f. cost, plus import duty and surtaxes).

Once approved, the procurement must be handled by one of the two government trading agencies, the Central Trust of China (CTC) or the Taiwan Supply Bureau (TSB). In some cases, the government end user may request a "restricted tender" and designate a specific foreign supplier; in cases where suppliers are limited, negotiation may be undertaken. However, a requirement that "approved equals" must be considered tends to inhibit the gearing of specifications to particular suppliers. Thus, in practice, most government procurement is open to competitive worldwide bidding.

In the case of bidding, CTC or TSB announces scheduled procurements in newspapers and bulletin boards, with invitations to bid made available at advertised localities. Notices are also issued abroad through CTC's 11 branch offices, including one in New York and one in Los Angeles (Appendix D). Bids may be tendered direct by the foreign supplier or through his local Taiwan agent with a power of attorney. Each bidder must pay a bid bond of 1 percent of the bidding price which is returned if the bid is unsuccessful. The successful bidder must deposit a performance bond equivalent to 5 percent of the contract value within 14 days after the notice of award. Cargo delivery must conform to the terms of the contract. Normally, payments are made by L/C without the extension of foreign credit in order to save interest payments in foreign exchange.

In addition to handling all procurement for Government end users, CTC and TSB are also authorized to buy certain items for their own account. These are usually essential and heavily imported foods or raw materials which, if bought in bulk when the world market price is lowest, would save foreign exchange as well as permit regulation of the supply to be allocated. Included are crude oil and petroleum products, fertilizers, tallow, rubber, leather, timber, glass, cement, motor vehicles, various chemicals, metals, foods, textile materials, and a few other items. A complete list of items which only CTC or TSB may import is given in Appendix D.

## **QUOTATIONS AND PAYMENTS TERMS**

The Chinese Government is trying to promote the use of Chinese shipping to save freight costs payable in foreign exchange. At present, the fleet is not large enough to carry substantial cargos outside the Asia region, say from the United States to Taiwan. Thus, U.S. suppliers may quote on c.i.f. or c & f basis, except occasionally in the case of CTC procurement for which f.o.b. prices may be requested. If c.i.f. or c & f quotations are used, however, the cost, insurance, and freight charges are to be identified separately. Japanese suppliers may only quote on f.o.b. basis.

The New Taiwan dollar, the official currency in Taiwan, is not convertible. All payments for imports from the United States are made in U.S. dollars. The official selling rate for import business is US\$1= NT\$40.10.

There are five approved methods of payments in Taiwan—L/C, D/P, D/A, consignment, and installment plan. By law, trading firms are eligible only for L/C, D/P, and consignment purchases while end users may pay under L/C, D/A, D/P, and installment plan. Further, FETC limits D/A, D/P, and consignment purchases only to the import of industrial raw materials approved by FETC. In practice, very little business is financed in these ways.

Nearly all imports, whether by trading firms, end users, or CTC and TSB, are paid for by irrevocable L/C. Under a special advance deposit requirement, the importer must open the L/C within 14 days after he is issued the import permit. This means in effect that the importer makes a cash payment well in advance of arrival of the import shipment. Thus, no extension of credit by the foreign supplier is involved, and there is little or no risk to him. The importer, however, suffers under this arrangement. Sometimes the advance payment comes out-of-pocket, an intolerable burden if he is poorly capitalized to begin with and that same money could earn him nearly 1 percent a month even in a savings account.

Certain importers, particularly those with greater assets and a steady income from exports, can apply for a loan covering up to 70 percent of the total payment required. Even so, they must put the remaining

30 percent down and pay 0.625 percent a month on the balance. The longer it takes for the shipment to arrive, be put to use, and the profit realized (turnover averages 5 to 6 months per shipment in Taiwan), the greater his loss in interest payments. The obvious lesson is that most importers will favor suppliers who can deliver the goods promptly.

A small but increasing amount of business is done on a deferred or time draft L/C basis (known in Taiwan as a Usance L/C). Under this procedure, the foreign supplier extends to the importer short-term credit of from 60 to 180 days. Interest charges may not exceed 5 percent a year, but this works out to about 1 percent or more a month for the 2- to 6-month duration of the loan. The Usance L/C's are only available for the import of raw materials and machinery for end users. All such transactions must have prior approval of FETC, whose main concern in this regard is whether the importer has sufficient resources to pay off the draft upon maturity.

Taiwan importers, of course, much prefer this arrangement to cash on the barrelhead, but FETC's screening process sometimes takes up to 25 to 35 days before a decision is made, and this discourages more widespread use of the Usance L/C. In practice, the main applicants for this type of credit are producer-exporters who can apply their export proceeds to paying off the draft. Thus, the goods involved are usually raw materials for processing and reexport.

The installment payment plan, in effect a long-term supplier credit, is available only to end users and mostly for the purchase of heavy machinery and equipment. Each such transaction must be approved by FETC. By law, the maximum interest rate chargeable to the importer is 6 percent, considerably below prevailing rates in the economy. Most manufacturer-importers are therefore very much interested in supplier credits. However, FETC generally opposes such credits, except for multimillion dollar purchases, in order to avoid foreign exchange losses in interest payments. Possibly, however, as the foreign exchange situation continues to improve FETC will liberalize its screening criteria and permit greater use of supplier credit.



# Commercial Facilities and Marketing Aids

Taiwan's commercial, banking, insurance, and warehousing facilities and services are not well developed for a country which relies so heavily on foreign trade. Nor are marketing research, consulting, and advertising facilities. Therefore, before getting too deeply involved in dealings with local businessmen, American businessmen interested in the Taiwan market should consider using economic and commercial intelligence facilities in the United States, including those available from the U.S. Department of Commerce and the U.S. banks having correspondent relationships with Taiwan banks.

## **BANKING**

Taiwan's banking system comprises 10 Government-controlled organizations, 5 private commercial banks, and 4 foreign banks. In addition to the banks, there are some 82 cooperative credit associations, 8 savings and loan companies, and 295 credit departments of Farmers Associations from whom credit is obtainable (Appendix D).

Foreign exchange business is transacted by the Bank of Taiwan, the Bank of China, the five commercial banks (First Commercial Bank of Taiwan, Hua-nan Commercial Bank, Chang-hua Commercial Bank, Shanghai Commercial and Savings Bank, and the

Overseas Chinese Commercial Bank), and the four foreign banks (First National City Bank of New York, Bank of America, the Nippon Kangyo Bank, and the Bangkok Bank of Thailand). The scope of operation of these institutions as it affects foreign trade includes handling outward and inward remittances, opening and accepting letters of credit, purchasing export bills, accepting foreign currency deposits, making foreign currency loans, and providing credit information services. The two U.S. banks were not allowed entry until 1965 and are still precluded from engaging in full-scale commercial banking activities. Standard bank charges for handling foreign exchange business are listed in Appendix D.

## **INSURANCE**

There are 25 insurance companies, all Chinese, licensed to operate in Taiwan. The Government has frozen the number at this level since 1963 to avoid further proliferation, yet Taiwan has fewer insurance companies than most countries in this area. Until the ban is lifted, branches of foreign insurance companies will not be permitted. However, the Government permits local agents to represent foreign insurance companies in some cases. Present coverage by local firms includes life, property, casualty, and liability. One

**FIRST GOVERNMENT INDUSTRIAL ESTATE:** the Liutu Industrial District is served by public facilities. Land in the district can be paid for on the installment plan, and loans are provided to build factories.

firm handles marine insurance; all reinsurance business is handled by the Central Trust of China.

## **WAREHOUSING**

With high interest rates favoring quick turnover of capital, storage of goods in warehouses becomes very costly. Hence, there is little demand for independent warehousing facilities. Most general traders cannot afford the cost of storage and for that reason rarely import items that have to be stored. Some manufacturers store raw materials and replacement parts on their own premises, keeping just enough on hand for short-run use. Other manufacturers, including the Government-owned firms, use the warehousing facilities of the Taiwan Supply Bureau (TSB) and the Central Trust of China (CTC). TSB operates the largest number of warehouses (about 175), but total storage capacity is limited. TSB charges private firms about 42 to 50 cents a ton monthly and Government clients 30 to 40 cents.

A new bonded warehouse regulation was adopted in 1965 which permits duty-free entry and storage of certain raw materials intended for processing and reexport in finished form (Appendix D). The bonded warehouse procedure replaces the complex and time-consuming duty rebate system. If the measure proves successful, other raw materials for processing and reexport will be included. Additional warehouses are being built to accommodate the new procedure.

## **MARKETING SERVICES**

The concept of market research is scarcely understood or as yet appreciated by most of Taiwan's producers and traders. Demand projection, cost calculation, and other basic factors which U.S. manufacturers rely on to determine how much to produce and when and to whom to sell are considered only by the very large firms in Taiwan, particularly the locally based foreign companies. For the most part, production and sales decisions are opportunistic and follow a jump-on-the-bandwagon approach. This often leads to over-concentration on a particular commodity or export market, cutthroat competition, very low profit margins internally, and, consequently, a need to import raw materials and equipment at lowest possible cost.

There is little in the way of good marketing research services available in Taiwan. Two Government organizations provide some such services—the China Productivity and Trade Center and the Industrial Development and Investment Center. However, they are mainly concerned with assisting Taiwan exporters and foreign investors; their emphasis is not on the internal Taiwan market for direct sales from abroad. Thus, U.S. suppliers will either have to do their own research or employ a firm outside Taiwan (e.g., a U.S. firm with a branch in Tokyo) to do the job.

Credit information on local firms is sparse. Taiwan firms tend to be secretive about their financial status, and the local banking institutions are generally not equipped to provide such information. Once they become more firmly established, the two new U.S. banks in Taiwan will undoubtedly introduce modern credit information collection procedures. A new firm—the Taiwan Credit Information Service—established in late 1964, is the only local firm believed to have some prospect of gathering reliable data on credit worthiness. Alternatively, U.S. suppliers would be well advised to make use of the World Trade Directory Reports (WTDR's) available from the U.S. Department of Commerce as sources of credit information on particular firms in Taiwan. See p. 16 for further details.

Management and engineering consulting facilities have not yet developed in Taiwan. Management is still too personalized in the hands of family heads who run so many of Taiwan's businesses and are usually set in their ways. Engineering consulting, on the other hand, is recognized as important, but local capability is still meager. There are some 22,000 engineers of all kinds in Taiwan, or roughly a 1-to-500 ratio of engineers to total population compared to 1 to 200 in the United States. While the U.S. ratio is unreasonable for Asia, it indicates there is a substantial technology gap which often must be filled from abroad.

The demand for foreign engineering services is most pronounced in large-scale public works projects. In addition, the large corporations planning major expansion projects, particularly if a foreign loan is involved, generally require imported engineering assistance. U.S. engineers who are licensed at home may practice freely in Taiwan without a Chinese license. Otherwise a Chinese license must be obtained. U.S. consulting engineers, however, must have a local Taiwan representative before they can practice. He may be a Chinese national or a foreign citizen (including U.S.) resident in Taiwan. For further details on requirements affecting U.S. consulting engineers in Taiwan (and all other free-world countries), see the *Engineers' Overseas Handbook*, published by the U.S. Department of Commerce and available for \$2.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.<sup>2</sup>

<sup>2</sup> Some excellent economic and commercial information is published in local journals. Three journals are particularly worthy of consideration: *The Industry of Free China*, published monthly, is the most authoritative English-language journal on economic matters of all kinds, especially economic development planning, and conditions and prospects in particular industries; the *Taiwan Trade Monthly*, concentrates on trade and investment trends and opportunities, as well as developments in the economy that affect trade and investment; and the bimonthly *Economic Review* of the Bank of China, a Government publication which specializes in monetary developments, also covers trade and industry conditions in Taiwan. Each of the three publications provides excellent statistical compilations. Overseas subscription rates for *Industry of Free China* and *Taiwan Trade Monthly* are \$6.00 a year and the *Economic Review* is free of charge.

Advertising is an underdeveloped art in Taiwan. Only about \$11.4 million was spent on advertising in 1965—roughly 90 cents per capita, compared with \$10 per capita in Japan and \$75 in the United States. One reason for the dearth of advertising is that local businessmen have not grasped its significance as a sales tool. The constant refrain, “It doesn’t pay off,” may have some merit when applied to machinery and raw materials. The number of major end users is small enough in many industries to permit effective direct contact by phone, correspondence, or personal interview. This approach, however, virtually ignores the increasing number of smaller firms setting up shop in import-reliant industries who should be reached.

Another reason for the low level volume state of advertising is the tendency of traders and manufacturers to create and place their own advertising, instead of relying on professional agencies. For example, the advertisers almost always personally design and print their own direct mail, pamphlets, and brochures, and they do much of their own advertising in publications, on the radio, and via outdoor campaigns. The professional agencies usually handle only the TV and cinema work and some outdoor spectaculars. The top 12 advertising agencies in Taiwan account for about 40 percent of total advertising creation and placement. At present there are no U.S. advertising firms with affiliates in Taiwan.

Among the several media available, newspapers account for about 50 percent of total advertising dollars. The rates are published, but sophisticated advertisers can negotiate for reductions of from 30 to 65 percent. Taiwan has 33 newspapers, of which 16 are published in Taipei and 2 in English. Total circulation is estimated at 750,000, very high for Asia. About half the typical issue is devoted to advertising. Newsprint is locally made, and reproduction of images is extremely poor.

Radio and TV time accounts for about 23 percent of advertising expenditures and is sold at published legitimate rates. There were about 1.4 million radio sets and 60,000 to 70,000 TV sets in Taiwan in 1965.

Magazine advertising (about 2 percent of total) is generally confined to technical and engineering journals for the sale of machinery and equipment. Other media include outdoor (14 percent), cinema (4 percent), and direct mail and others (7 percent).

Whatever the medium used, advertising in Taiwan should be adapted to the local Chinese since they comprise the mass of the consuming public. The adaptation, however, should not have the effect of disguising the foreign origin of the product, inasmuch as its foreign character generally gives it a higher social and pecuniary value. Rather, the idea is to emphasize its foreign origin in a way which is clearly understood by the public. For example, if people are depicted,

they should have Chinese faces; signs and movies should have Chinese subtitles.

The importance of adapted advertising underscores the desirability of relying on local facilities through which to carry on an advertising program. Most foreign suppliers prefer to have their local sales representatives do the advertising work. This arrangement is advantageous because of the agent’s familiarity with local customs and his direct interest in increasing sales.

Allowances provided for advertising vary with the product. In general, products which require advertising in the United States will need to be advertised even more intensively in Taiwan. The expenditure for advertising may average about 5 percent of sales price for soft goods such as wearing apparel and shoes, to 20 percent for proprietary drugs and pharmaceuticals. Raw materials and machinery will probably need from 2 to 5 percent of sales price for advertising.

### **MARKETING AIDS AVAILABLE IN U.S.**

Businessmen with oversea activities often make good use of private and government agencies that provide commercial information. Some of these facilities and sources are described below.

Data on marketing, and economic and commercial conditions in Taiwan may be obtained from the Far Eastern Division, Office of International Regional Economics, Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C. 20230, or from any of the Department’s field offices which are located in principal U.S. cities (Appendix D, p. 120). Available are reports on the economy, trade, laws about doing business, import and exchange controls, business centers, ports, and tariffs. Many of these data have already been published for use by exporters. See reference to U.S. Department of Commerce, Bureau of International Commerce, *Checklist of International Business Publications*, in the bibliography.

Information on specific commodities or industries is available from the U.S. Department of Commerce, Business and Defense Services Administration (BDSA), which collects, analyzes, and publishes information on the worldwide commercial activity of 20 general industry categories. A complete list of BDSA publications may be obtained from any Field Office or the U.S. Department of Commerce, Washington, D.C. 20230.

Information on agricultural commodities, livestock, and agricultural development programs is available from the Foreign Agricultural Service of the U.S. Department of Agriculture, Washington, D.C. 20250.

The Chamber of Commerce of the United States, 1615 H Street, N.W., Washington, D.C. 20005, has a Foreign Commerce Department to assist international traders.

Banks and shipping companies, as well as private trade associations and consulting firms, are additional sources of economic and commercial information.

In planning trips to Taiwan, businessmen are advised to make advance arrangements by visiting or writing the Commercial Intelligence Division of the U.S. Department of Commerce, Washington, D.C. 20230. The Division forwards details on the itinerary and purpose of the trip to the American Embassy in Taipei, thereby alerting it to provide all possible assistance, including the setting up of appointments and plant visits. Once in Taiwan, businessmen are encouraged and always welcome to call on the U.S. economic and commercial officers in the Embassy and to avail themselves of all the facilities there, including the commercial reading room.

Embassy officers report on the business standing, reputation, ability, and activity of Taiwan firms. Their reports may be obtained from the U.S. Department of Commerce or its field offices for \$2 per firm. A detailed description of these World Trade Directory Reports (WTDR) is available on request.

Lists of firms (Trade Lists) handling specific commodities in specific countries are available for \$1 per country for each product from the Commercial Intelligence Division. These lists can help locate importers, agents, wholesalers, and distributors within Taiwan.

Many exporters may find the export guarantees or export credit insurance offered through the facilities of the Export-Import Bank of Washington, the U.S. Government's principal export-financing agency, worthwhile in financing foreign sales. Information on this Bank's programs is available through local commercial banks or from the Eximbank, 311 Vermont Avenue, N.W., Washington, D.C. 20005.

To supplement its own dollar loans, the Bank makes

financial assistance from private sources more readily available to the American exporter. It underwrites foreign credit insurance, issues guarantees to commercial banks, and considers direct guarantees and financing for exporters when insurance or commercial bank assistance cannot be obtained. In providing these facilities the Bank takes into consideration the ability of the importer to make payment, the appropriateness of the credit terms involved, and the ability of the importer's country to service dollar debt.

The Eximbank also arranges export consignment insurance.

U.S. exporters now receive faster, better, and more flexible credit insurance services. Five programs are available to facilitate credit extension on favorable commercial terms to overseas customers. Four provide insurance policies issued by the Foreign Credit Insurance Associations (FCIA) and underwritten by that Association and the Eximbank. FCIA is an association of more than 70 private insurance companies. The fifth program, designed so that exporters may seek nonrecourse financing from their banks, consists of guarantees by the Eximbank to commercial banks or other financial institutions.

Most of the FCIA's policies have been for short-term transactions of up to 180 days. Exporters who supply consumer goods abroad are finding this coverage attractive because it enables them to sell on 90-, 120-, or 180-day credit. The comprehensive short-term policy insures up to 85 percent of the commercial risks and up to 95 percent of the political risks. It is also possible to insure against political risks alone.

Insurance for medium-term transactions is also available in both comprehensive and political-risk-only policies. Terms vary from 181 days to 5 years. Much of this type of insurance relates to sales of capital goods and equipment.



# The Competition . . . and How To Beat It

The following chapters will provide an analysis of specific sales opportunities available to U.S. suppliers in Taiwan in light of present economic conditions and growth prospects, and within the framework of the import control system. The opportunities available do not automatically fall into the laps of would-be U.S. suppliers. Far from it. For many items, U.S. firms will find tough competition every step of the way from other suppliers, principally Japanese, to whom the same fast growing opportunities are equally, perhaps even more readily, available.

## **MAJOR COMPETITORS**

Taiwan does not appear to be a highly competitive market in the normal sense of attracting many contending sellers. It seems rather a captive market dominated by two major supply sources—Japan and the United States. It is captive in the sense that many essential raw materials and capital goods are not available locally and must be imported if the economy is to develop. Its heavy dependence on these two countries is seen in the fact that it obtains more than 70 percent of its total imports from them. The percent accounted for by these countries was 75 percent in 1960 and 71 percent in 1965—34 percent from the United States and 37 percent from Japan. While the combined share of these countries is gradually losing out to other suppliers, imports from the strongest contenders—from Western Europe—aggregated only 10 percent of the market in 1965. On a

specific commodity basis (appendix C), competition from European and other suppliers can be quite formidable, but on an overall basis it is not significant.

This currently favorable supply situation is no cause for complacency on the part of U.S. suppliers. About \$66 million, or 35 percent of the U.S. share of the Taiwan market, was financed under U.S. AID and PL 480 programs<sup>1</sup> in 1965. The AID program has already been terminated effective July 1965, and the PL 480 program will gradually be phased out. Thus, this \$66 million of trade will be exposed for the first time to Japanese and other competition—about \$25 million worth of manufactures immediately and \$40 million of agricultural trade as the PL 480 program phases out (appendix D).

Conceivably U.S. suppliers could sell commercially some portion of the items which heretofore have been AID financed. Of Taiwan's strictly competitive imports in 1965 (\$489 million), the U.S. share was 26 percent (\$125 million) compared to Japan's 37 percent (\$206 million). Though still comfortably ahead of Europe's aggregate 10 percent (\$54 million), the United States is clearly up against very stiff competition from Japan. As far as the U.S. suppliers affected are concerned, this development alone has sufficed to transform Taiwan from what would normally be a seller's market to a highly competitive

<sup>1</sup> Public Law 480, as it affects Taiwan, provides for the sale of U.S. surplus agricultural commodities for New Taiwan dollars (Title I) or for U.S. dollars repayable within 20 years.



**BOTH U.S. AND JAPANESE HELP:** firms from both countries provide technical assistance to the Yue Loong Motor Co., Taiwan's only automobile manufacturer. Yue Loong makes trucks, jeeps, sedans and motor scooters.

buyer's market. For it is apparent that the Japanese are making a strong marketing effort in Taiwan.

Japanese suppliers presently enjoy several key competitive advantages over U.S. suppliers in the Taiwan market. The most important of these are Japan's proximity to Taiwan and its long history of contact with the Taiwanese people. These have given Japan an edge in shipping and business travel costs, in delivery time, and in access to Taiwanese buyers.

Just as important in accounting for Japan's success in the Taiwan market, however, is the greater aggressiveness of the Japanese businessman in creating his own competitive advantages. The techniques used include willingness to cut prices, extend credit, and coinvest with Taiwan manufacturers; high priority treatment of export orders; effective distribution practices; follow-up servicing of exported equipment; and aggressive salesmanship. Most U.S. exporters to Taiwan have not used these techniques. Many have not had to do so until now because of the large and readily available AID-financed sales opportunities. Much of the substantial 40 to 45 percent U.S. share of the market available annually in Taiwan before 1964 was financed with AID funds.

Typically, the U.S. supplier has rarely traveled to Taiwan or attempted to meet the sales terms or services of his competitors. Too frequently, the U.S. supplier has been content simply to appoint a local agent and expect customers to take the initiative. Now that AID financing is gone, U.S. exporters will have to give more attention to the marketing of their products. By 1967, except for some PL 480 commodities, nearly all Taiwan's imports will be purchased on a worldwide competitive basis. The Japanese exporter, in particular, is well prepared for the new market situation owing to his built-in competitive advantages and aggressive salesmanship.

U.S. products still preferred in Taiwan are:

- Highly sophisticated or unique materials and equipment which are obtainable in suitable form only from the United States;
- Spare parts to repair machinery and equipment already purchased from the United States, particularly under the AID program; and
- Superior quality materials and equipment which are priced within 10-15 percent of the competition.

Prospects are, however, that Taiwan's greatest import needs in the next few years will be more for

relatively unsophisticated, moderately priced, and qualitatively adequate machinery and equipment, and for standard raw materials obtainable from any number of sources. This, then, is the kind of market which U.S. suppliers will increasingly be facing—a large and rewarding but highly competitive market.

There are specific and feasible approaches open to U.S. suppliers in the face of mounting foreign competition. Flexibility and aggressive salesmanship are paramount—flexibility on price, delivery, credit, and distribution; and aggressive salesmanship in terms of finding customers, educating them as to what is best for them, and convincing them that the product offered fits the bill.

### **THE PRICE FACTOR**

Taiwan is, above all, a price market, and will continue to be one for some time to come because of (1) very high local interest rates which favor the least possible expenditures of capital; (2) the widespread feeling among local manufacturers that they must buy the least costly raw materials and equipment so that the final product, when exported, can compete abroad; (3) the Government's import licensing criteria, which aim at the least expenditure of foreign exchange;<sup>2</sup> and (4) the Government's tendency to accept the lowest bid on goods procured for its own consumption, irrespective of quality or other considerations.

Department of Commerce research indicated, significantly, that U.S. f.o.b. prices are competitive with Japanese f.o.b. prices for a broad range of products. However, the higher freight charges (roughly 4 to 5 times those of shipments from Japan) weigh heavily in the landed cost of U.S. goods. Thus, Japanese c.i.f. prices of many industrial goods tend to average 20-30 percent less than the U.S. equivalent in most cases.

The crucial price differential appears to be in the range of 10 to 15 percent. Japanese products, though recognized as usually inferior to U.S. makes, are nevertheless considered by most purchasers as adequate for Taiwan's needs, and the premium for superior quality would rarely exceed 15 percent.

When Japanese suppliers encounter price competition from other foreign (including Japanese) suppliers, they may cut prices in order to make a sale and meanwhile secure a near monopoly by discouraging competitors. Once the monopoly is achieved, losses incurred in the process can be more than offset. Another Japanese tactic is to offer lower prices for equipment requiring continuous supplies of spare parts. Taiwan buyers are either not aware of the

<sup>2</sup> Although foreign exchange has become fairly abundant in the last year, import screening criteria are still conditioned by the history of shortage. There are signs of progressive relaxation, but the process of change may be rather slow.

higher cost to them in the long run, or do not object to it. They would rather make the smallest possible initial outlay since they are generally undercapitalized and cannot afford the high local interest rates on borrowed capital.

To meet this price competition, U.S. exporters might consider:

- (a) Concentrating on product lines which come within the 10-15 percent differential;
- (b) Adapting their product for the Taiwan (and most other Asia markets) by stripping it down to the basic production unit;
- (c) Taking in consideration in their price quotations, as many of their Japanese competitors do, the repeat business generated by the demand for spare parts and components or auxiliary equipment involved;
- (d) Emphasizing and selling the idea that the superior quality of U.S. products ultimately results in lower production costs; and
- (e) Investigating the possibility of setting up a central warehouse and distribution facility (in Hong Kong, for example) to take advantage of cheaper freight rates for larger shipments for the trans-Pacific haul.

### **THE DELIVERY FACTOR**

Prompt, timely delivery is always a competitive asset in any market. In Taiwan, because of the Government's advance deposit requirement on imports and the high prevailing interest rates, it is essential. Taiwan importers are required to pay for half the value of their purchase and open the letter of credit (L/C) within 14 days after receiving an import permit. The purposes of this requirement are to maintain surveillance of foreign exchange disbursements, to guarantee payment to the supplier, and to discourage imports. The importance of quick delivery is seen in the fact that the importer's capital is tied up for as long as it takes the goods to arrive after the L/C is opened. Even if he is able to borrow money from a local bank to make the advance deposit, his interest charges of 0.625 percent a month become extremely costly if delivery is delayed. In this context, as well, stockpiling of raw materials and components for longer run use becomes a luxury, while fast turnover and, accordingly, prompt delivery become crucial to the buyer.

Delivery time from Japan to Taiwan, port to port, is 4-10 days, compared with 30-50 days from U.S. ports. Obviously, little can be done to reduce transit time direct from the United States except perhaps to build inventory in a Hong Kong storage facility for reexport to Taiwan (and other countries) when orders are placed. This should be considered when-

ever possible, as bulk delivery to Hong Kong also offers several pricing advantages.

However, the transit time differential is not usually the most serious delivery problem for U.S. suppliers. The real problem is one more within the power of the exporter to solve—namely, the total elapsed time between the initial placing of the order by the importer and actual arrival of the goods in Taiwan. The average order-to-arrival times from Japan and the United States are 2 and 6 months, respectively, for most items except heavy or specialized machinery. This difference is due namely to the fact that most Japanese suppliers treat export orders on a priority basis, and many Americans do not. U.S. suppliers have a reputation in the Taiwan market for not even beginning production of the order until an L/C has been opened. In addition, U.S. suppliers will often request extensions of the L/C because they find they cannot meet the time schedule. These are exceedingly poor practices when exporting to Taiwan, and Taiwan buyers do not put up with them for very long.

### **THE CREDIT FACTOR**

Foreign credit transactions are discouraged by FETC in order to minimize interest charges payable in foreign exchange, even though, in so doing, the buyer winds up paying more because of the higher local currency interest costs. Two FETC requirements inhibit the use of foreign credit to finance imports—the advance deposit requirement and a requirement that only end users can apply for long term credit. (p. 10). In effect, the two requirements tend to stifle commercial middlemen, i.e. importer-wholesalers and distributors. To operate effectively, these middlemen must carry stocks and have showrooms. Turnover is slow. Since they are not eligible for long-term credit, are not the best of risks for short term credit, and usually cannot afford to pay cash in advance, they find it hard to survive in business. This leaves the end users as the only good prospects for long- or short-term credit sales.

Nevertheless, credit can be an extremely important competitive factor in the sale of raw materials, and machinery and equipment to such end users. Suppliers willing to take the risk get excellent results, particularly from short-term (60-180 day) credit for the sale of raw materials, and an increasing business is done on this basis. Long-term credit (usually 3-10 years and payable in installments) for the sale of machinery and equipment is used less frequently since it can be offered only to end users and since a local bank guarantee cannot be obtained without the Government's approval of each installment payment proposal. The Government tends to be reluctant to approve such arrangements.

Japanese suppliers are strongly credit oriented in

their sales campaigns, while U.S. suppliers have shown little enthusiasm for credit ventures. Japanese readiness to extend credit, both short and long term, is not usually intended to counteract U.S. competition. Most Japanese suppliers admit that they have to extend credit to compete against each other. However, there is no known basis for the often heard rumors of spectacular Japanese credit terms. At least in Taiwan Japanese terms are reasonably conservative. Short-term credit has been running 1 percent or more a month, depending on the risk. Long-term credit is at about 5.75 percent a year, a 20 percent down payment. Probably U.S. suppliers, if so inclined, can match any terms being offered by the Japanese.

Japanese techniques in the credit field are worth exploring in some detail. In offering short-term credit, Japanese suppliers take what seem to be extraordinary risks, but the default rate is reportedly very low. Owing to the advance payment requirement, the only feasible means of extending short-term credit is to allow the buyer a deferral, usually 60-180 days, for paying the draft. The supplier delivers the goods. The buyer guarantees or promises to pay in 60-180 days. The buyer uses the goods during this period. After the 60-180 day grace period, he pays in full. This arrangement, known as a Usance L/C in Taiwan, requires prior Government approval. An estimated 25 percent of total Japanese exports to Taiwan are purchased under Usance L/C's.

Although payment is handled through the Japanese branch bank in Taiwan (the Nippon Kangyo Bank) and the supplier gets his money immediately from that bank, the supplier nevertheless assumes the ultimate risk in case of default. This is because the Nippon Kangyo Bank requires a guarantee from the supplier that the customer will pay up when the 60-180 draft matures.

The Usance L/C arrangement is in effect an unsecured loan from the supplier to the buyer, and, accordingly, the interest rates are fairly high (at least 1 percent a month). Even at that high rate, U.S. suppliers usually avoid such transactions. One reason for the lack of U.S. interest in extending short-term credit is the paucity of credit information on Taiwan firms. However, there are certain safety features in this arrangement, both financial and cultural, which lessen the actual risks. For example, the goods sold are usually raw materials, and the customers are almost always manufacturer-exporters who can process the materials, export the finished product, make their profit, and pay up before the 60-180 day limit expires. In addition, the Japanese supplier will try to deal with customers who can put up their own collateral. When this is not feasible, the supplier will accept a guarantee, supported by collateral, from two or three prominent friends or relatives of the cus-

tomers.<sup>2</sup> The quality of trustworthiness based on personal honor and "face" is especially important in the Orient and may itself constitute justification for Japanese credit without prominent guarantors, if they cannot be found. This sociological factor, so important in Sino-Japanese business relations, scarcely impresses the American businessman but can be in fact an effective safeguard.

As noted earlier, Taiwan end users cannot obtain a Government bank guarantee for long-term credit transactions without specific FETC approval. Once the approval is given and the Taiwan bank guarantee is secured, however, the risk to the foreign exporter is virtually nil. Japanese suppliers understand this fully and, acting through the Japanese Export-Import Bank, are more than happy to sell on an installment-payment basis. In contrast to the usual U.S. Eximbank procedure, the Japanese Export-Import Bank loans are made to the Japanese exporter rather than to the foreign importer. The Japanese supplier then relends to the Taiwan importer on terms set by the supplier. Reportedly, the Japanese Export-Import Bank will not extend a credit for use in Taiwan without a Taiwan bank guaranty. However, action is automatic and immediate if the Taiwan bank guarantee has been secured.

Japanese suppliers get their Export-Import Bank loans at upwards of 4 percent and, in turn, normally charge their Taiwan customers 5.75-6 percent a year, 20-25 percent down payment, and 3-10 years to pay. (Chinese law prohibits interest rates higher than 6 percent on such transactions). The down payment is often staggered, e.g., 5 percent down, 10 percent on delivery, and the remaining 10 percent six months after delivery.

To compete with Japanese suppliers in the credit field, U.S. suppliers should strongly consider greater use of 60-180 day Usance L/C's to Taiwan importers of raw materials, on the strength of guarantees backed by the importer, prominent businessmen, and/or a local commercial bank. U.S. firms should also strongly consider long term supplier credits (3-10 years on D/A terms) for sales of heavy machinery, if the importer's application for installment payment has been approved by FETC. If U.S. commercial bank credit cannot be obtained, even though the long term credit would be guaranteed by the Chinese Government, U.S. suppliers should explore the loan, guarantee, and insurance facilities available from the Export-Import Bank and the FCIA.

<sup>2</sup> Taiwan firms are notoriously undercapitalized, principally because money is tight, and also to avoid local taxes assessed on capitalization. Thus, potential buyers frequently do not have adequate collateral themselves, or their assets may already be mortgaged for some other purpose. Therefore, a procedure has evolved whereby prominent friends or relatives of the buyer will guarantee his payment. If the buyer fails to pay, a rarity because disgrace and loss of face are intolerable, the guarantors are liable.

## **THE DISTRIBUTION FACTOR**

There are four ways to reach buyers in Taiwan. From the most to the least effective, they are (1) establishing a branch office; (2) establishing a regional office in Hong Kong or Tokyo to service the Taiwan market; (3) selling through a locally appointed commission agent; and (4) direct selling without a local intermediary of any kind. In addition, it may be worthwhile under certain conditions to invest in or license a plant to produce the product locally.

A branch office of a type similar to those established by certain Japanese suppliers, clearly offers the most effective means of distribution. However, since it requires a relatively greater capital investment than other techniques, the branch office should be considered only if the supplier anticipates a large sales volume for a specific product, or if he has a diversified line of products to sell. A successful American branch office would be more than an order taker. Although it would not need to import for its own account, it would search for sales opportunities, know who the buyers are and when materials and equipment are needed, advise on and guarantee Usance L/C's when the need arises, and provide technical advice and engineering services on the products it handles.

The branch office should receive full support from the parent office and/or other principals. It should have full authority to quote prices and negotiate contracts and adequate advertising allowances. Support should include timely presence of a key troubleshooter from the home office when needed.

Few U.S. firms outside of the business machines field have branch sales offices in Taiwan, although some have regional offices in Hong Kong or Tokyo. Taiwan's once limited market has grown so substantially in the last few years that now there is clearly a need for additional U.S. branch offices (or at least regional offices serving Taiwan regularly).

The need is heightened by the dearth of importer-wholesalers and distributors who can buy and sell for their own accounts and who have the wherewithal and incentive for aggressive promotion. In markets where such middlemen operate successfully, they can satisfactorily perform many of the functions of a branch office. In Taiwan, however, the only alternative to a branch office is a local agent, a far cry in terms of performance and effectiveness.

Most local agents in Taiwan are simply order takers working on an indent basis. They are permitted to represent any number of suppliers and when left to their own devices tend to overload themselves and then push only the easy sale, ignoring the slower moving lines. Many are not equipped to provide technical advice or service. They will not guaran-

tee short term Usance credits even on the safest risks. According to one of the largest indent firms in Taiwan handling U.S. accounts, local agents cannot afford to risk the guaranteeing of Usance credits because their income (derived from commissions only) is not large enough to cover possible defaults by Taiwan customers. Rather than draw lines as to which customers are or are not credit worthy, the agent simply refuses to guarantee any credits.

Despite the inadequacies of local agents in Taiwan, it is preferable to use this distribution medium than sell direct without any local representation, the main advantage being that the agent is empowered to issue quotations in the supplier's behalf. In addition, only suppliers who have local agents in Taiwan (or a branch office) can sell on D/A or D/P terms. There are about 1,000 firms in Taiwan qualified to act solely as commission agents. In addition, most of the 2,200 or more registered traders also handle commission accounts.

While there is no real substitute for a branch office, the combination of a local Taiwan agent and a regional sales office in Hong Kong or Tokyo can be effective; the supplier's regional officer can thereby keep closer watch on the local agent to assure that the product is always given maximum sales promotion.

The right agent may be found among reputable "lean and hungry" firms: one that is not overburdened with other accounts and would be able to devote much of its attention to the supplier's product. On the other hand, large, well-established firms, even though they have multiple accounts, are usually staffed by specialty—sales, engineering, research. This can be a decided advantage when the product is of a complex or sophisticated nature requiring more technical expertise than door knocking to promote effectively.

Local agents operate under a set of special regulations promulgated by FETC. All local agents appointed by foreign suppliers must be given an exclusive contract, i.e. the agent must be the supplier's sole representative for whichever line or lines are covered in the contract. Other agents may be appointed to represent different and unrelated products of the same supplier. Conversely, the agent normally will not represent any competitive products of other suppliers but this not being a requirement, the supplier should verify in advance that his agent will not take on competitive lines.

Commissions vary widely with the product sold, but average 5-10 percent. Standard exceptions are bulk raw materials (metals, cotton, etc.) and heavy machinery, mostly under 2 percent; and spare parts and machinery requiring the agent's technical services, often 15-20 percent. The agent usually handles local advertising and publicity, but the extent of his ad-

vertising efforts depends on the size of the advertising allowance granted by the supplier. If the supplier is generous in this regard, more advertising can be undertaken.

Although many agents in Taiwan are not particularly aggressive, direct selling without intermediaries of any sort is futile. The Taiwan buyer might have pursued the supplier under the AID program, and occasional success might still be possible in selling to the Government. Otherwise, the only possibility of making a sale without a local contact is if the supplier's product is unique or a highly specialized one, if that fact is known to the buyer in Taiwan, and if the buyer happens to need that particular product.

Because many products are still subject to import restrictions—particularly consumer goods—none of the above conventional approaches to the market is of any value in selling them. The only alternative is to produce the items locally by setting up a wholly owned subsidiary, by joining with local investor-partners, or by licensing a local firm to produce them. Profits or royalties can usually be fully remitted. Moreover, the gains can be maximized by stipulating in the investment or licensing agreement that the raw materials, components, and/or machinery required to produce the product locally must come from the investor or licensor. Since Taiwan manufacturers are long on ambition but short on capital and technology, they are very receptive to joint foreign investments and licensing agreements. Moreover, Chinese Government investment incentive laws and investment promotion agencies strongly encourage such undertakings. (For details on procedures for investing or setting up licensing arrangements in Taiwan, see the Department of Commerce publication "Establishing a Business in Taiwan", Part I, No. 67-23.)

### **THE SALESMANSHIP FACTOR**

Selling to the private sector in Taiwan requires an intensive promotional campaign. It is also a teaching process. U.S. suppliers should start by assuming that the buyer who needs something may not know it, in which case the need must be pointed out to him. If he recognizes the need, he often will not know what is best for him or even what the best is. In short, he is reachable.

Providing the buyer with catalogs and other product literature is an absolute minimum necessity. These printed materials need not be translated into Chinese, although this is helpful. Industrial films or models showing the item or process in operation are valuable. On-the-spot demonstration, if feasible, is of course even more effective. In some cases, it may be desirable to invite the buyer to the supplier's plant to see for himself. A direct approach through the supplier's agent, or preferably by the supplier himself, in

combination with any or all of the above techniques, is the best approach.

One factor which hampers U.S. suppliers in particular is the widespread reluctance of Taiwan buyers to purchase from anyone other than the actual foreign manufacturer through his branch office or local agent in Taiwan. Rarely will they buy from combination export managers or other middlemen in the supplying country. This attitude stems from the false impression that the price will necessarily be higher if selling is through an independent export house as opposed to direct by the manufacturer. Few Chinese realize that the cost of maintaining a special export department by the manufacturer may be just as great as the commission charged by independent export managers who represent producers not having special export departments. Since this attitude will not easily be dispelled, U.S. combination export managers may find Taiwan a frustrating market and manufacturers should be aware that they may have to establish direct contact with the prospective buyer or risk loss of the sale.

Selling to the Government sector is far easier in terms of the approach but just as difficult in terms of meeting the competition so here again a strong promotional effort is needed. First, the supplier and/or his agent should try to ascertain in advance whether particular Government end users are planning expansion projects (a good local agent with broad contacts can do this effectively); second, they should

make an aggressive sales presentation as early as possible to convince the prospective buyer that their equipment is best suited for that agency's needs (this could result in specifications attuned more nearly to the product being sold); and, third, and perhaps most important, they should make the price as low as possible.

The essential ingredient in selling both to private end users as well as the Government is to give fullest possible support to the local agent. This means keeping him current on prices and new products, keeping him adequately supplied with catalogs and other product literature, answering his correspondence, and providing him with an adequate advertising allowance and all the other basic amenities which suppliers give their distributors in selling to the U.S. domestic market. If the product is not moving, periodic on-the-spot investigations by a home company official may be indicated to help determine whether the product is competitive, whether the agent's morale and efforts need boosting, or whether a more effective representation is called for.

The Taiwan market does not require a superhuman sales effort. American products are their own best salesmen in many cases. They can compete well with the best the competition can offer, providing their features and virtues are made known to the buyer. Very often, all that is needed is the same brand of salesmanship used to great advantage in the domestic market.





# Selling to Manufacturers

Taiwan's manufacturing sector accounts for more imports than all others combined, mainly because (1) natural resources are scarce and most of the key local industries are import reliant and (2) manufacturing activity is booming, thereby creating greater demand for raw materials and machinery. There may be some change in the structure of demand as more import substitutes are produced locally, but the overall outlook is for sharply increasing imports in both the short and long run. Anticipated expansion of the heavy, the sophisticated, and the export processing industries, in particular, will directly stimulate importation of both raw materials and machinery. Promotion of labor intensive industries will also enhance demand for imported raw materials, while the development of industries using local raw materials will require increased imports of productive equipment.

Total imports of raw materials, intermediates, components, and machinery and equipment by the manufacturing sector reached \$390 million in 1965, up 150 percent over the 1960 level of \$155 million. By 1968, they could well exceed the \$500-million level.

## **THE BUYERS OF PRODUCER GOODS**

The ultimate consumers of imported producer goods are the 29,573 factories in Taiwan. In some cases, they buy direct from the foreign suppliers; more often, they buy through the 2,000 or more sales agents on the island or, if they are government-owned fac-

tories, through the two Government procurement agencies—the Central Trust of China (CTC) and the Taiwan Supply Bureau (TSB). There are very few importer-wholesalers equipped to buy and sell imported producer goods for their own account.

Of the 29,573 registered factories on the island in 1965, nearly 85 percent (more than 25,000) were small scale, i.e. capitalized below 2,500, having less than 5hp. in total power generating equipment installed, and employing fewer than 30 persons. The remainder were considered large scale by Taiwan standards but would be medium size by U.S. standards. Only about 500 factories are big in the U.S. sense, the largest being Government owned. The latter group of 500 factories accounts for the greatest share of imports. (Table 9 in Appendix B shows the composition and relative size of Taiwan's factories.)

This does not mean that U.S. exporters should ignore small-scale producers in favor of the large companies. On the contrary, there has already been too much emphasis by U.S. suppliers on the "big" sale. Smaller producers represent a greater potential market for increased sales, particularly for raw materials. For one reason, the number of smaller factories is increasing at a faster rate than large firms. In the last 13 years, the number of small factories has increased by 559 percent, while large factories increased by only 112 percent. Secondly, the aggregate demand of smaller producers within the various industries is already substantial and homogeneous enough to warrant a marketing approach which can accommodate individual small orders. Thirdly, that demand is rising quickly and, as the economy continues its dynamic

**FROM CRUDE TO GOLD:** the Kaohsiung refinery of the Chinese Petroleum Corporation turns imported crude oil into high-grade gasoline and intermediate products for the island's petrochemical industry.

growth, today's small manufacturer could well become a substantial importer in another few years. It would prove highly beneficial to have built up a business relationship with that firm during its growth period.

### **FACTORS IN PURCHASING DECISIONS**

The factors influencing the purchasing decisions of small and large scale buyers differ, as do those of government and private buyers, although some considerations are common to all.

Small-scale private firms are typically family owned and managed, technologically deficient, undercapitalized, but highly flexible. Purchasing decisions usually are made by the owner himself, and he is more often than not uneducated and uninformed about new processes and technological innovations. Whatever technical expertise the small firm has is usually supplied by an educated son or relative. The shortage of capital often compels the small firm to buy in small lots, to buy cheaply with little regard to quality and on credit whenever possible. However, family enterprises are not the best of credit risks. Collateral is limited and family accounting tends to be secretive, although not necessarily unreliable. Small firms can survive only by being flexible and quick to adapt to changing conditions, and, therefore, they may be more receptive to advice as to new ideas, new raw materials, and new tools and machines. They are also more inclined to use multipurpose machinery rather than the more specialized equipment used by the large, mass production firms.

Like the smaller producers, large-scale private manufacturers are often undercapitalized relative to their size. However, they have more access to short- and long-term credit because their assets are greater and, as exporters, have a more stable and consistent income. Also as exporters, they must consider the quality of their products and in line with this, the quality of the raw materials and machinery they buy. In addition, large manufacturers generally have a high volume turnover and need a constant supply of raw material. Since they also have adequate storage facilities, they prefer to buy in bulk and from the supplier who can deliver promptly.

Much of Taiwan's large-scale production is done on an assembly line basis. However, since labor is abundant and cheap, manual and semiautomated processes are more common than full automation. The larger firms have better organized management, and many have their own import or purchasing departments or engineering departments to advise or decide on which goods should be procured and from whom. Many of the large firms, like the small ones, lack know-how and technology. Foreign technical assistance is therefore highly prized, particularly in

the form of expert advice or, even better, in the form of licensing agreements or joint venture investments. The latter are beneficial to the foreign licensor or investors, in that the arrangement often stipulates the use of the foreign firm's machinery or raw materials which it otherwise might not be able to sell in Taiwan.

Government factories, though on a par with the large private producers in terms of capitalization and output, operate under different procurement criteria. Normally, all procurement by government-owned corporations must be effected through the Central Trust of China (CTC) or the Taiwan Supply Bureau (TSB). Roughly 23 percent of all imports financed with Government foreign exchange are handled in this way, reflecting the importance of government participation in the industrial sector. Nearly all the large producers are government owned. Altogether, there are some 26 government enterprises involved to some extent in most of Taiwan's industries. They accounted for 39 percent of the island's total industrial output in 1965, and about 16 percent of imports (excluding aid-financed imports). A complete list of government-owned corporations is given in Appendix D.

CTC and TSB procurement is usually done through tenders open to competitive worldwide bidding. In some cases, the government factory may suggest restricted tenders limited to a specified country source; in cases where supplier firms are limited, negotiated bids may be authorized. In open tenders, the lowest bid is usually successful. Occasionally, even on an open tender, the buyer is able to draft specifications which, in effect, rule out all but the piece of equipment actually wanted. This is difficult, however, because of the government's procurement requirement on open tenders that not just the specified equipment, but approved equals must also be considered. As a consequence, many government corporations sometimes cannot escape having to equip their plants with machines of varying quality and origin to perform the same function.

Another aspect of government procurement is the preference for straight cash purchases in order to avoid interest payments in foreign exchange. Thus, most sales to government corporations, even of heavy equipment, are made on a straight cash basis. (For details of bidding procedures see p. 10).

Certain raw materials may only be imported by CTC or TSB. These are usually procured in bulk when commodity prices are low, so that an adequate domestic supply can be maintained and distributed locally at a reasonably stable price. Some of these are wheat, soybeans, chemical fertilizer, raw cotton, wool, manmade fiber, and crude oil. (For a complete listing of commodities imported directly and only by CTC and/or TSB, see Appendix D).

## MARKET FOR SPECIFIC PRODUCTS

The import demand for specific producer goods will largely depend on four factors: Availability of local raw materials and productive equipment; Taiwan's capability for developing import substitutes to meet industrial needs; growth prospects for particular import-reliant industries; and the extent of import controls and duties on specific items. The best sales prospects will be for those goods which are not now or likely to be available locally in adequate supply and quality, which are needed by local industries most likely to expand, and which are not unduly restricted.

Taiwan's industrial resource supply is limited. Except for materials provided by the agricultural sector—foods, timber, livestock—and a few nonmetallic minerals, most other primary raw materials have to be imported. The island's machinery capability is confined to a few kinds of unsophisticated light industrial equipment. Thus the overwhelming portion of machinery requirements must also be imported. Taiwan is still far from being able to replace imported machinery with their own brands, and prospects are dim for the discovery of additional primary resources. Therefore imports are likely to grow with demand. Not so, however, for intermediate products required by industry. Taiwan is rapidly developing import substitutes for intermediates currently imported in volume, for example base metals and chemicals. In the long run, therefore, imports of many intermediates will probably fall off.

Basically, Taiwan has two groups of import reliant industries. First are the light and heavy industries which depend almost entirely on imported raw materials and produce mainly with imported machinery and equipment. These include many of the largest industries—the textile, plywood, paper, pharmaceutical, plastics, electronics, rubber, oil refining, iron and steel, aluminum, machinery and appliance, and vehicle-assembly; among the smaller ones are the tobacco, leather, and dairy industries.

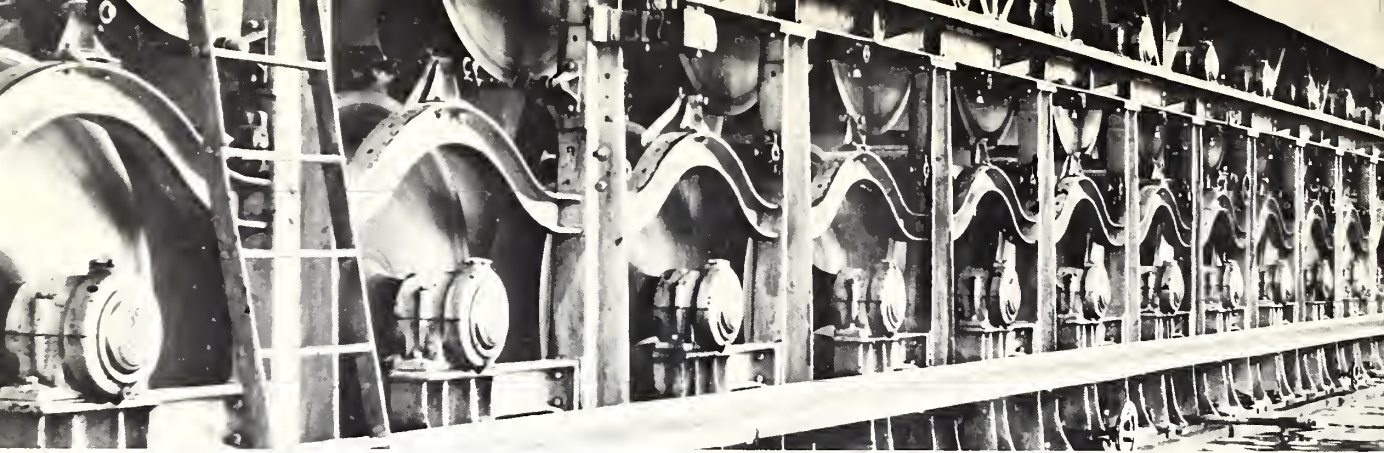
The second group of import consuming industries comprises those which produce mainly with imported machinery and equipment but which can utilize locally available raw materials and intermediates. These include sugar refining, food canning and freezing, beverage, glass, cement, metal and nonmetallic mineral mining, oil and natural gas prospecting, lumber, pulp, and the electric power industries using locally available primary raw materials; and the clothing, lubricating oil, fuel, petrochemical, and part of the chemical, plastics, and paper industries using intermediates mostly produced in Taiwan. Appendix A contains a detailed inventory of the consumption requirements of Taiwan's major industries showing as of the time this survey was made which primary and intermediate materials and machinery and equipment



**HOT SPOT:** demand for steel is growing steadily due to industrial expansion. Establishment of an integrated steel mill on Taiwan is being actively promoted.

items are locally available, which must be imported, and the extent of import.

Using that inventory in Appendix A, best overall sales prospects for producers goods can be narrowed down to those which must be imported by industries having the highest growth potential. These industries, in turn, can be identified by their past output per-



**COOPERATION PAYS OFF:** paper-rolling machinery gives a wave-like effect at a plant at the Taiwan Pulp and Paper Corp., which has entered into technical cooperation with a leading foreign manufacturer to produce high quality papers.

formances; their relative attractiveness to new local and foreign investors; and the relative priorities accorded them in the Government's various promotion and encouragement programs.

In general, the expanding industries are the export processing industries and those which are producing raw materials, intermediates, and machinery for other local industries. Those with the smallest potential are those producing consumer goods for local consumption only, those which have limited export potential, or those whose export markets are becoming saturated.

In terms of past performance (see Table 7 in Appendix B), the following products within the major industries have had sustained, rapid output growth exceeding 20 percent a year (production of asterisked items was begun after 1960).

*Textiles*—wool yarn, woolen serges, synthetic fabrics, silk fabrics\*, underwear, hosiery\*, and shirts\*.

*Wood products*—plywood.

*Pulp and paper*—pulp, paper bags, and carbon paper.

*Rubber products*—automobile tires and tubes, rubber belt, rubber rollers\*, and foam rubber\*.

*Mining*—lime, crude oil, and natural gas.

*Food processing*—peanut oil, peanut cake, MSG, and canned and frozen foods\*.

*Chemicals*—Sulfuric acid, hydrochloric acid, salt, sulfur black, urea, ammonium sulfate, ammonia, powdered and refined camphor, camphor oil, plastic powder, plastic products, carbide, industrial BHC, and detergents\*.

*Base metals*—pig iron, cast iron pipe, steel balls, aluminum ingot, iron wire, wire cable\*, and steel cable\*.

*Machinery and appliances*—prime movers, water pumps, power tillers\*, machine tools\*, water meters\*, electric motors\*, electric cookers\*, household refrigerators\*, transformers, fluorescent lamps, and general machinery and parts.

*Vehicle assembly*—automobiles.

*Ceramics*—ceramic tile, cement bricks.

The following industrial products have also shown a rapid, but more moderate (10-20 percent a year) expansion since 1960:

*Food processing*—canned pineapple, tea, beer.

*Textiles*—rayon staple, synthetic yarn, knitting yarn, and canvas shoes.

*Wood products*—lumber, pencils, matches.

*Pulp and paper*—paperboard and stencil paper.

*Rubber products*—bicycle tires and tubes, rubber boots.

*Mining*—gypsum, sulfur, and talc.

*Chemicals*—caustic soda, calcium superphosphate, nitrochalk, fuel oil, paints, soap and toothpaste, and plastic tooth brushes.

*Base metals*—tin plate, aluminum sheet, aluminum products, and aluminum extrusions.

*Machinery and appliances*—electric bulbs.

*Ceramics*—cement bricks.

*Electric power*—electricity.

The category of industrial products that has shown gradual or no expansion (under 10 percent a year) or in some cases a decline in output includes:

*Food processing*—canned meat and poultry\*, wheat flour, brown sugar, refined sugar, molasses, yeast, soybean oil, soybean cake, nonalcoholic and alcoholic beverages.

*Tobacco*—leaf tobacco, cigars, and cigarettes.

*Textiles*—rayon filament, cotton yarn, cotton fabrics, jute yarn\*, jute fabrics\*, gunny bags, towels.

*Wood products*—treated lumber\*, artificial board\*, and bagasse board.

*Pulp and paper*—paper.

*Leather products*—leather shoes, upper leather, sole leather.

*Rubber products*—pedicab tires, cart tires and tubes, and rubber hose.

*Mining*—coal, gold, silver, copper, pyrite, marble, asbestos, and dolomite.

*Chemicals*—soda ash, calcium cyanamide, fused

phosphate, nitrophosphate, nitrogen solution, alcohol, printing ink, bleaching powder, liquid chlorine, industrial DDT, potassium chlorate\*, oxygen\*, gasoline, kerosene, diesel oil, asphalt, and coke.

*Base metals*—iron and steel rods, bars and slabs, black plate, galvanized sheet, nails, aluminum foil, and collapsible tubes\*.

*Machinery and appliances*—sprayers, sewing machines, dry batteries\*, battery poles, insulated wire, copper wire\*, enameled and cotton covered wire\*, electric fans, watt hour meters, high voltage electrolytic capacitors\*, telephones\*, and switchboards.

*Vehicle assembly*—shipbuilding, trucks and buses, bicycles, and bicycle frames\*.

*Ceramics*—plate glass, glassware\*, fire bricks, fire clay, and asbestos tile.

Industrial products which have the best production records are most likely to enjoy further progress. Accordingly, import demand for the raw materials and/or machinery required to produce those items should also increase at much faster rates than the producer goods required for the less active industrial products. Consideration should also be given to the fact that, among the more dynamic industries, the Government has selected eight which are to receive special promotional emphasis during the current Four-Year Plan and which, therefore, should particularly require increased imports of raw materials and/or machinery. These designated industries are the food processing, petrochemical, plastics, manmade fiber, iron and steel, machinery and appliance, electric power, and all export processing industries. To encourage the export processing industries in particular, the Government in 1965 opened the island's first Export Processing Zone in Kaohsiung. All factories allowed to set up in the Zone will be exempted from import duties on their imports of raw materials, semifinished products, and machinery and equipment, provided the finished products are exported.

The export processing industries eligible to establish in the Zone include the following:

#### **First priority . . .**

Precision machines and instruments, including timepieces (watches and clocks), chemical instruments, automatic control instruments, electronic instruments, radioactive ray instruments and musical instruments.

Electronic manufactures, including transistor radios, vacuum tube radios, television receivers, tape recorders, and electronic telecommunications equipment and supplies.

Optical manufactures, including cameras, binoculars, microscopes, magnifying glasses and slide projectors.

Metal manufactures, including hand tools, metal manufactures for construction and household use, tablewares, and home decorative wares.

Plastics manufactures, including flowers, toys, and household items.

Machinery manufacturing, including all kinds of machinery for export.

Furniture.

#### **Second priority . . .**

Handicrafts.

Electrical appliances, including household appliances, electric razors, and small motors.

Rubber manufactures.

Chemical manufactures, including candles, soaps, detergents, antibiotics, and photographic chemicals.

Printed matter, including books, pamphlets, and stationery.

Confection products.

Cosmetics.

Hide and leather manufactures, excluding the processing of raw hides.

#### **Third priority . . .**

Knitted and woven goods, excluding those with cotton as raw material.

Garments, excluding those with cotton as raw material.

The acid test of the growth potential of particular industries is whether entrepreneurs are willing to risk capital in them. From 1960 to 1965, a total of 10,785 new factories were registered in Taiwan. Of these, 4,408 were new food processing plants and 1,926 were in chemicals, mainly plastics and pharmaceuticals. The remainder comprised machinery and tool making 692, ceramics 601, base metals 574, lumber and woodworking 537, textiles 466, printing and bookbinding 388, and others 1,193.

Foreign investors have followed a similar industry-type pattern. Of the 284 equity and loan investments made by foreign and overseas Chinese investors through June 1966 (valued at \$75.6 million in actual arrivals), 31 (\$6.7 million) involved food processing; 35 (\$8.2 million) textiles and apparel; 62 (\$13.4 million) petrochemicals, pharmaceuticals, and other chemicals; 28 (\$7.0 million) machinery and appliances; 5 (\$1.0 million) electronics; 6 (\$1.5 million) mining; 5 (\$244,000) base metals; 6 (\$1.2 million) paper; 2 (\$218,000) plywood; 1 (\$1.6 million) glass; 4 (\$1.4 million) cement; 1 (\$37,000) leather products; 1 (\$28,000) rubber products; 6 (\$260,000) plastics; and 3 (\$240,000) printing.

Another factor affecting sales potential of specific producer goods is the extent of import controls and duties imposed on them. In general, producer goods are not restricted or heavily taxed. Some of those

which do appear on the "controlled import" list may still be imported, but only by end users with prior Government approval. Importer-wholesalers are not permitted to import any producer goods on the controlled list. Most of the producer goods on the controlled list are tightly restricted to protect local industries, and even end users have difficulty getting import licenses for those items. A list of those controlled imports which may only be imported by end users appears in Appendix D. Import duties on producer goods generally range between 10 percent and 25 percent, excluding surcharges.

### **MOST NEEDED PRODUCER GOODS**

U.S. producer goods, by and large, are benefiting substantially from the dynamic expansion of industrial demand underway in Taiwan. While a number of U.S. products have succumbed to competitive forces, particularly as the AID program has been phased out, many others have strengthened their position in the market. The following U.S. producer goods, categorized according to their level of imports in 1965, are believed to have the best prospects for future sales growth. During the 5-year period 1960-65, their sales increased at a faster rate than competitive products from other sources, and their market share has risen accordingly. Moreover, the same demand factors which occasioned their better-than-average sales growth up to 1965 are still present and are likely to continue over the next several years. (The U.S. share of the market in 1965 is given in parentheses. See tables in Appendix C for 1965 import values.

#### **Best U.S. Sales Prospects**

U.S. sales above \$5 million in 1965—iron and steel scrap (70); steam engines, turbines, and parts (99); raw cotton (65).

U.S. sales between \$1 million and \$5 million in 1965—leaf tobacco (83); sulfite wood pulp (53); phthalates (60); synthetic resins (48); sulfur (31); inedible animal oils and fats (99); pumps and pumping machinery (76); aircraft parts (99); automotive vehicle parts (18); radio parts and accessories (41); line telephonic and telegraphic apparatus (71).

U.S. sales between \$100,000 and \$1 million in 1965—mercury (29); calcium phosphate (87); potassium chlorate (99); borax, crude and refined (99); resin (64); flavoring essences (25); old newspapers for pulping (99); unworked aluminum (85); unworked zinc (14); decorated tinplate (99); steel pipes and fittings (25); steam boilers and boiler house plant (99); boiler fittings and mountings (51); industrial air conditioning machinery (78); office machinery (35); oil drilling and refining equipment (70); radar apparatus and radio navigation equipment (78);

transistors, photoelectric cells, and thermionic tubes (22); batteries or cells (22); radio telephonic, telegraphic, and broadcasting apparatus (67); mechanical handling vehicles (42); aircraft engines (100); surgical and medical instruments (30); tires and tubes (70); office supplies of paper (71).

U.S. sales between \$10,000 and \$100,000 in 1965—inedible vegetable oils and fats (32); inks (25); glue (39); waste cotton (58); packing and wrapping paper (77); unworked nickel (14); worked nickel (62); aluminum sheets and plates (87); aluminum wire (67); wire rope (19); welding rods (17); metal articles for binding and capping (85); transmission chain parts (18); bulbs, tubes, and arc lamps (19); electrolytic condensers (21); household electrical fixtures (17); electrical visual signaling equipment (11); copying machines (19).

A second category of U.S. producer goods includes those whose sales to Taiwan have increased, but not as rapidly as sales of competitive products by other suppliers. Thus, while these U.S. products have increased in overall sales value, their share in the market has declined. Since Taiwan import demand for these products is still increasing, the fall in the U.S. market share is mainly the result of intensified competition from third-country suppliers, particularly Japan. More promotional effort is clearly needed if U.S. products in this category are to benefit to a greater degree in Taiwan's industrialization.

#### **Good U.S. Sales Prospects, but Greater Promotion Required**

U.S. sales above \$1 million in 1965—plain tin plate (12); mining and excavation machinery (42).

U.S. sales between \$100,000 and \$1 million in 1965—synthetic rubber (33); waste paper (62); pitch and asphalt (90); surface active agents (16); plastic manufactures (35); nonferrous metal scrap (24); unworked zinc (14); tool steels (11); steel pipes and fittings (25); insulated wire and cable (12); textile machinery (6); metalworking machinery (14); machine tools (11); machine shop tools (15); refrigerator parts (12).

U.S. sales between \$10,000 and \$100,000 in 1965—soaps and detergents (71); essential oils (11); paraffin (10); waxes (20); cellulose lacquers (24); paperboards (18); insulating materials (14); magnet blanks (10); low voltage power generating machinery (14); electrical ignition equipment (13); industrial refrigeration machinery (13); typewriters (30); parts for record players and tape recorders (10); safes, cash boxes, and vaults (55).

The following U.S. producer goods, which include several mainstays of U.S. trade with Taiwan in the 1950's and early 1960's, have generally declined in sales volume in the last few years. A number of factors have contributed to this decline. Most importantly, Taiwan's development and protection of import substituting industries have simply reduced import requirements from all sources, including the United States. Import demand for some of these items could continue to go down. In the case of other products, however, imports as a whole have increased, while only those from the United States have decreased. Here, the main factor is more extensive competition from third-country suppliers. U.S. sales in this latter category (asterisked) could probably be stimulated by a more aggressive competitive effort.

### **U.S. Sales Declining, May Fall Further**

U.S. sales above \$1 million in 1965—lubricating oil (57)\*; internal combustion engines and parts (20)\*.

U.S. sales between \$100,000 and \$1 million in 1965—lubricating grease (55)\*; cow hides (22)\*; high-voltage power generating machinery (16)\*; pulp and paper machinery (25); hand tools and implements (10)\*; railway materials and parts (39).

U.S. sales between \$10,000 and \$100,000 in 1965—transformer oil (34); flotation reagents (67)\*; carbon blacks (14)\*; paints and enamels (25)\*; carbolic acid (7)\*; zinc sheets and plates (19)\*; nuts, bolts, and nails (26); locks and padlocks (19)\*; sewing machinery (5); knitting and embroidery machinery (2); electricity meters and parts (26)\*; water meters and parts (10)\*.

Following is a list of producer goods imported into Taiwan which are not supplied by the United States to any significant extent. U.S. sales of these items in 1965 were either all valued under \$10,000 or their share of the market was under 10 percent in that year. In some cases, Taiwan imports only negligible amounts from any source (total imports of asterisked items were valued under \$50,000 in 1965). In other cases, the United States does not produce the items and/or does not export them. In still other cases, where there is both an import demand in Taiwan and a supply capability in the United States, the meager U.S. sales are most likely due to a competitive problem, or lack of effort, or lack of interest. On balance, however, prospects for increased U.S. sales of the listed items are not likely to improve greatly.

### **U.S. Sales Under \$10,000 or Accounting for Less than 10% of Market in 1965**

Raw wool; all textile yarn, thread and piece goods; chemical elements; acids; sodium compounds; potassium compounds; manganese diox-

ide; methyl alcohol; alkyl benzene; rubber chemicals; synthetic organic dyestuffs, titanium dioxide, and other pigments; stearine; varnish; turpentine; shellac; linseed oil; tanning materials; gums, ammonium sulfate, phosphate rock, crude oil; fuel oil; asbestos fiber; asbestos manufactures; cement\*; gypsum; tiles\*; glass sheet and plate\*; natural rubber; waste rubber; rubber manufactures; hides other than cow; skins\*; leather\*; logs, timber, and lumber; cork and cork sheet; chemical wood pulp\*; mechanical wood pulp\*; coated paper; printing and newsprinting paper\*; document paper\*; glassine paper and cellophane; tissue paper; wallpaper; cigarette paper; iron ores; bauxite; other metallic ores; aluminum foil; brass bars and rods, sheets and plates, tubes and fittings, wire, strips and bands; other worked brass\*; copper brass and rods, sheets and plates, tubes and fittings, wire, strips and bands; worked and unworked lead; unworked tin; ungalvanized iron and steel sheets and plates; galvanized sheets; worked and unworked structural shapes; iron and steel wire, bands and strips, castings and forgings, angles, nail rods, hoops and rails; spring steel; silicon steel; metal netting, grill and fencing; steel balls; ball, roller, and needle bearings; crucible molds and parts; high tension insulated cable; farm and fishing machinery; sugar manufacturing and brewing machinery; dairy machinery\*; flour mill machinery; tobacco processing machinery; printing and bookbinding machinery; rubber manufacturing machinery; machine tool lathes; electric traffic control equipment; electric sound signaling equipment; starters, dynamos, and parts; motor vehicle chassis; motorcycle parts; bicycle parts; ships and boats, materials, and parts.

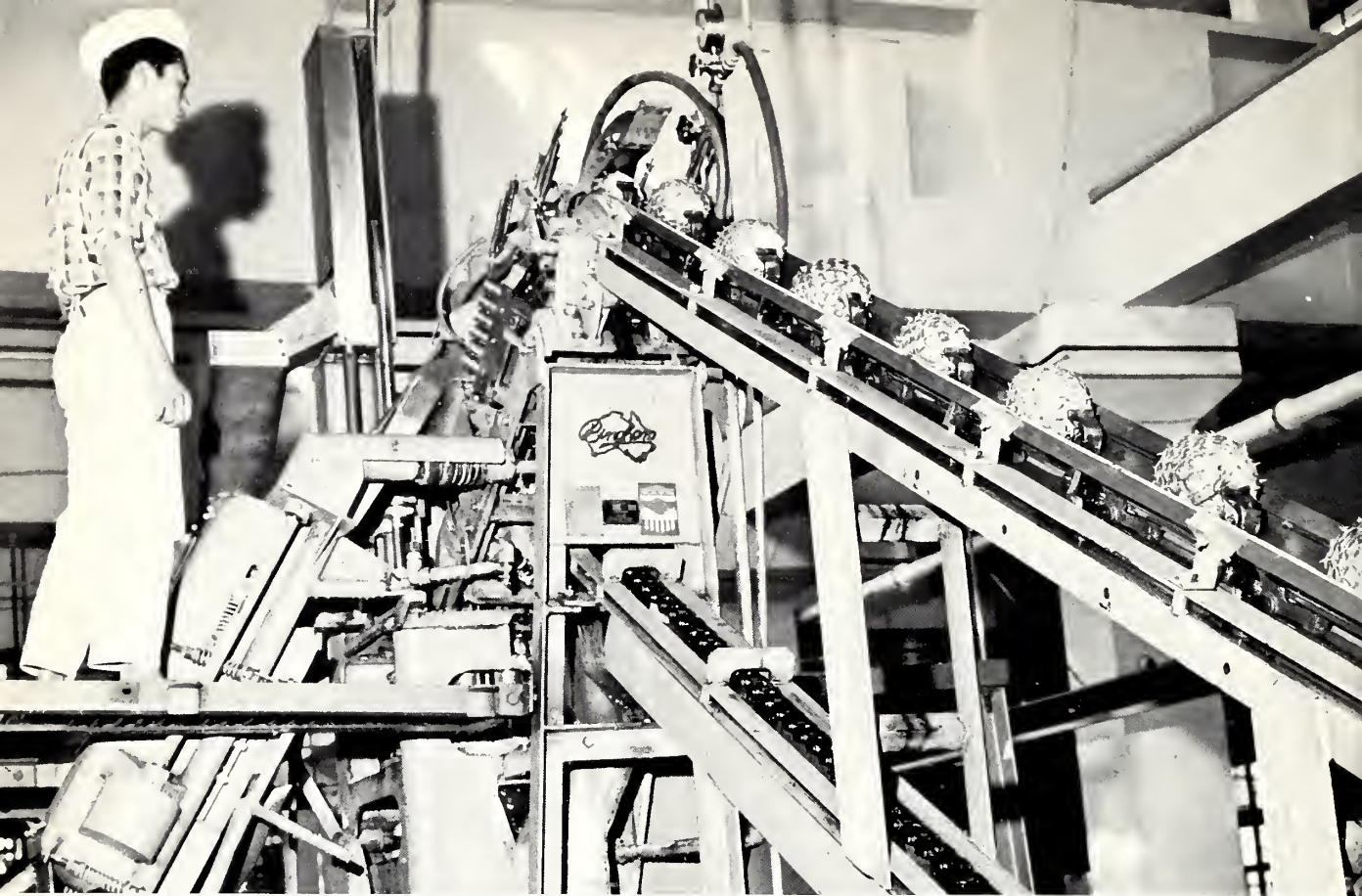
### **SPECIFIC MANUFACTURING INDUSTRIES**

The following analysis of specific industries in Taiwan is geared to the would-be U.S. supplier of raw materials, intermediates, and machinery.

It shows the extent of specific raw material and machinery usage in each industry; whether and to what extent the needed items are locally produced or must be imported; the principal sources of supply; and the pertinent import controls and duties. It also describes the status and outlook for each major industry—relative size, current product mix, growth prospects, and the specific expansion projects, if any, which have been programmed and which would require increased imports of producer goods.

#### **Food Processing**

Taiwan's young food processing industry has excellent potential. It has already enjoyed rapid ex-



**HEADING OVERSEAS:** these pineapples will emerge in cans and, like 90 percent of all of the Republic of China's three million case output each year, find their way onto the export markets of the world. Taiwan's food processing industries are also a leading buyer of imported machinery.

pansion, has very good export prospects, has much room for diversification, and is one of the industries specially promoted and encouraged by the Government. Drawing mainly from ample local supplies of sugar, fruits, vegetables, fish, poultry, and some meat and other foods, the value of food processed by the industry rose from \$143 million in 1960 to \$230 million in 1965. During the same period exports of processed food, excluding sugar, increased from \$11 million to \$64 million.

Despite the abundance of local foods, the industry is by no means self sufficient. Some primary grains and other produce for processing still need to be imported, and the industry's further growth will certainly require increased imports of machinery and equipment for food canning, bottling, freezing, and packaging, as well as refrigerated storage and distribution facilities, packaging materials, tin plate, and can-making machinery. Opportunities for U.S. suppliers of food processing equipment are very promising. However, while direct sales potential looks good for the immediate future, the best insurance for longer run sales may be to team up with a local food processor, with the proviso that U.S. equipment be installed in the new plant. Otherwise, Japanese sup-

pliers may well get in first on the same basis and monopolize the sale of food processing equipment.

Taiwan's total imports of food processing machinery, including canning, bottling, refrigerating, and packaging equipment, amounted to about \$500,000 in 1965. The United States and Japan were the leading suppliers. In general, American quality in machinery is recognized, but practical considerations of cost and size have until now directed purchase of as much local machinery as possible. Most factories are expanding, but on a step-by-step basis, and are therefore not yet prepared to invest in very large-scale, highly automated equipment. All are aware that cheap labor will not last forever and eventually mechanization must come, but they prefer to buy one small machine at a time because production has not yet reached the scale where large models are practical. Therefore, if American equipment manufacturers are to be competitive in Taiwan now, machinery must be relatively small scale. This general condition is true of all types, from food processing to food packaging equipment.

American suppliers in some cases, especially in the frozen food industry, have already overcome these obstacles. In addition to better quality, more advanced technical know-how is offered, and most im-



portant, familiarity with the needs of the American market for the local producers' products.

A Government-supported Food Industry Research and Development Institute was established in 1965 to assist further development of food canning and freezing and dehydrating fields. It will also build a pilot plant and laboratory in Hsinchu. This organization will have a major influence on the types and sources of food processing equipment bought by local canneries, and U.S. suppliers would be well advised to maintain close contact with it.

The best sales prospects lie in the food canning, bottling, and freezing industry. This sector, particularly food canning, has accounted for most of the industry's growth in the last 5 years. Taiwan is already one of the world's leading producers and exporters of canned pineapple, mushrooms, and tea. Also fairly well established is the canning of mandarin oranges, asparagus, bamboo shoots, and water chestnuts. The "comers" include canning of pickles, fruit juices, jams, preserved fruits (lichees, longans, mangoes, passion fruit, guava, papaya, and fruit salad), peas, mixed vegetables, tuna, and prepared Chinese foods. The Government hopes to attract more foreign investment in all these fields. Particularly needed is technology in improving shape, packing, flavor, color, and sanitary techniques.

There are now some 180 food canneries and 5 can manufacturing plants in Taiwan. Total canned food production in 1965 was over 7.5 million standard cases and is still rising. Canned food exports rose from only \$10 million worth in 1960 to \$58 million in 1965. The industry's own 10-year plan projects output increases of about 1 million cases a year, but this pace may well be exceeded.

Most canneries in Taiwan are small. Of the 180 factories, only about 20-25 produce more than 100,000 cases a year. Their small size and the availability of cheap labor limit the use of automated equipment for the time being. The larger factories, for example, have a very small nucleus of permanent workers—between 10 and 70—with anywhere from 200 to 2000 standing by on seasonal basis. The peeling, washing, sorting, slicing, coring, trimming, preparing, and labeling operations are usually done by hand. Most of the equipment presently used is locally made. In an average canning factory, only some pumps and laboratory equipment are imported. Semiautomatic pineapple parers, mushroom grading cylinders, pineapple and mushroom slicers, semiautomatic and automatic sealers, semiautomatic bottlers, and conveyor belts are all locally available.

The demand for more sophisticated equipment in the canning industry will depend on how rapidly the industry develops. Certainly a greater tapping of Tai-

wan's export markets, for which rigid quality control and volume production is required, should create needs for semi- and fully-automated canning equipment from abroad. Other imports might include boilers, extractors, concentrators, fermenters, separators, and juice-making, jam making, and control instrumentation.

The canning industry has no carton packing machinery. Canneries may use this type of equipment in small-scale varieties, while factories making cans for sale to canneries, with their high-speed production, could well use such machines to pack empty cans in cartons for transport to the canning factories.

There are two modern bottling facilities in Taiwan, in addition to those run by the Government-owned Taiwan Tobacco and Wine Monopoly Bureau. Several outdated plants are also doing some bottling of guava, mango, and orange juice. Local soft drink bottlers are usually canners who bottle only during the summer months when soft drink demand is high. Semiautomatic soft drink bottling machines are locally made. However, a potential market does exist for imported bottle and jar washing, filling, and capping machines. Taiwan bottlers who export to the United States are often asked by the U.S. importers to conform to certain bottling specifications which in many cases can be met only by using American bottling equipment.

The food freezing industry is just getting started, but the potential seems unlimited. There are now 12 frozen food factories in Taiwan, all set up in the last two years, and more are expected. Taiwan's exports of frozen foods have increased from only \$280,000 in 1960 to nearly \$2 million worth in 1965. Before 1964 the only products to be quick frozen and exported were fish, eels, shrimp, and other sea food. Quick freezing of mushrooms, asparagus, peas, water chestnuts, brussel sprouts, strawberries, bananas, lychee nuts, prepared Chinese foods, and chicken and meat did not begin until 1964, and will undoubtedly expand. In addition to quick freezing, several companies are experimenting with various freeze drying processes, and one has already begun freeze-drying of mushrooms, using Danish equipment. Most of the quick freezing equipment is also imported, including freezing units of up to 5 tons, compressors, and industrial motors, mostly from the United States.

New types of freezing equipment offer the brightest prospects, and American equipment has an advantage owing to technical quality. Pumps are made locally, and packaging is now done entirely by hand. However, the complete lack of equipment on the packaging end suggests a market potential for this type of machinery, particularly if production demands intensify. Since frozen food plants are necessarily located near their source of food, the market for



**LARGEST FOOD PROCESSING INDUSTRY:** sales of sugar, such as that contained in these bins at a Taiwan Sugar Corporation refinery, earned the Republic of China \$130 million in foreign exchange in 1966.

imported refrigerated trucks should grow with the industry. Investments or licensing agreements in the food freezing field are definitely worth considering. Officials estimate that \$150,000 or \$250,000 would be needed to set up a medium-size frozen food plant.

Another relatively new field which is still in the experimental stage is dehydration of foods. A number of food processors have applied home-made equipment to what they consider very special variations on the normal dehydrating process. Although there are a number of primitive drying plants for various Chinese-style foodstuffs, only one or two companies are commercially involved, and these are mainly drying pineapple slices and bananas for the domestic market. However, interest in the dehydrated food field appears great enough to warrant proposals for selling machinery or for joint ventures or licensing agreements.

The sugar industry is Taiwan's largest and perhaps most important food processing industry. Refined sugar is the island's major export, accounting for 14 percent of the total in 1965, and is a basic ingredient of other processed foods. The sugar industry suffers, however, from uncertain world market conditions, and efforts are being made to keep sugar

cane acreage constant in order to avoid overproduction. Total production in 1965 exceeded a million tons, a record output.

All sugar refining is done by the Government-owned Taiwan Sugar Corporation (TSC) in its 25 sugar mills. Total daily grinding capacity is 57,000 tons of sugarcane. TSC is the largest profit making corporation owned by the Government. It is also the main grower of sugar cane, although contract farmers grow a large supply as well. In addition to its mills, refineries, and plantations, TSC owns an extensive railway system; byproduct factories (including bagasse board factories, a yeast plant, hog breeding farms, alcohol distilleries, and a pineapple cannery); warehouse and storage facilities which can accommodate about 550,000 tons of sugar; machine shops; wharf installations; and other properties.

TSC is in the 8th year of a 10-year program to modernize its sugar mills, and in the 4th year of a 10-year program to improve its plantations and railway facilities. These programs will require purchases of about \$16 million in imported refining and processing facilities, tractors (60 or more hp.), and diesel locomotives (42-inch gage). Present plans call for most of these purchases to be financed under a Japanese loan, which means that Japan will also be the source of supply. However, TSC would welcome offers from American suppliers if adequate credit terms can be arranged.

### *Beverage and Tobacco*

Production and distribution of alcoholic beverages is monopolized by the Government-owned Taiwan Tobacco and Wine Monopoly Bureau (TTWMB). That agency operates 11 distilleries and 1 brewery. Output (32 million gallons in 1965) consists mainly of rice wines, fruit-based wines, and beer. Hard liquors, liqueurs, and other spirits are not produced. Per capita annual consumption of alcoholic beverages was 8 quarts in 1965. All imports are tightly restricted to protect the local monopoly and to conserve foreign exchange. TTWMB occasionally imports some alcoholic liquors—about \$136,000 worth in 1965—for local distribution, and may increase this amount to complement its own lines.

The local demand for TTWMB products has not risen substantially in recent years (about 2 percent a year) and output levels have accordingly been kept rather stable. As a result, the need for new brewing and distilling equipment is limited. Some of it can be locally produced. About \$600,000 worth of malting and wine making equipment was imported in 1965, mainly from Germany. The air-conditioning equipment and control instrumentation comes mostly from the United States. TTWMB is the only eligible importer of brewing and distilling equipment, and the

duty is 12½ percent. Of raw materials, barley is imported from the United States or Thailand, hops from the United States or Germany, and malt from Australia. Roughly 10,000 tons worth \$1 million were imported in 1965. Again TTWMB is the only eligible importer for alcoholic beverage use. Duties are 7½ percent on barley, 25 percent on malt, and 40 percent on hops.

Nonalcoholic beverage production consists mostly of fruit juices and carbonated soft drinks in bottles. Total output in 1965 was 8 million dozen, up 60 percent over 1960. Some syrups and bottles are imported, but not in significant quantities.

Production and distribution of tobacco and tobacco products are also monopolized by the Government-owned Taiwan Tobacco and Wine Monopoly Bureau (TTWMB). In 1965, there were approximately 11 factories and plants manufacturing cigarettes and cigars and redrying leaf-tobacco. Both filter and non-filter, and some menthol cigarettes, are produced. Most of the cigarette and cigar output is consumed locally, although some is exported. Production of cigarettes and cigars has increased only gradually in recent years, and will probably not rise at a much faster rate in the future. The market is too limited for further expansion.

Thus, there will be little increased demand for such raw materials as leaf tobacco, cigarette paper, and filter-making materials, or for such machinery as cigarette making machines, filter machines, and packing machines. Taiwan supplies most of its own cigarette paper and filter materials and some of its tobacco leaf and machinery. Imports of tobacco leaf in 1965 were valued at \$3.5 million. The tobacco comes mostly from the United States and South Africa. The United States supplied much of the existing machinery, and Germany and Italy the more recent acquisitions. Machinery imports in 1965 were valued at \$574,000. Only TTWMB is permitted to import tobacco and the processing equipment; the import duties are 30 percent and 12½ percent, respectively.

Taiwan is taking steps to expand and improve its own leaf tobacco, and the market for U.S. tobacco may eventually be reduced. Two varieties of tobacco are now grown in Taiwan—the “Van Hicks” and “Van-Va-Gold”—both of which are resistant to Mosaic disease.

## **Mining**

Taiwan's mineral endowment is poor. The island's only abundant resources are nonmetallic, such as coal, limestone, marble, and dolomite. Taiwan also has sulfur, asbestos, talc, and gypsum reserves which supply part of present requirements. Of metallic resources, small quantities of copper, gold, silver, iron pyrites, manganese and limonite are mined, but the

ores are all low grade. No bauxite, lead, zinc, tin, nickel, or other important industrial ores are present on the island. While consumption requirements are growing rapidly, Taiwan's local minerals production rarely increases by more than 5 percent a year. The result is a sizable import demand, reaching \$8.7 million in 1965, with sulfur, bauxite, iron-bearing ores, and gypsum heading the list.

The paucity of native minerals has impeded mechanization of the mining industry. Most mining is done with hand tools. Techniques include trenching, test pitting, and tunneling and boring. Some geophysical prospecting by electrical and electro-magnetic measurements is also used in certain cases. Thus, on the whole, the demand for imported machinery is very limited, although it is tending to increase.

Revitalization of the mining industry is a major target of Government planning. Over the next 10 years, the provincial Government is to invest \$26 million in an effort to increase production, improve quality, reduce costs, and streamline procedures. It is not clear whether substantial mechanization of the industry will be involved, but there could well be some machinery sales opportunities arising from this development.

Coal (high-volatile bituminous) presently dominates the mining industry and accounts for over 80 percent of total minerals production. Workable reserves are estimated at 239 million tons, sufficient for about 30-40 years at foreseeable consumption rates. No coal is imported.

Efforts to increase coal production will be difficult. Generally, coal beds in most mines are heavily faulted and very thin, ranging from 1 to 3 feet thick, and moderately to steeply pitched. The mines are also extremely small. More than half of the 400 or more mines produce only 10 tons a day. Only about 34 mines can produce more than 100 tons daily. Mechanization is practically impossible under these conditions. Thus, hand labor constitutes 50-70 percent of the delivered price of coal. Efficiency is very low, about 0.4 tons per man-shift. Although the Government is pushing hard for improved productivity and greater coal production, there will probably not be much requirement for new machinery. A limited mechanization by the employment of selected mechanical installations is about all that can be expected.

Taiwan's sulfur output cannot meet local needs. The island consumes over 100,000 tons of sulfur a year, and the demand is increasing, particularly as the fertilizer, chemicals, textile, pulp, and rubber industries expand. Current sulfur ore reserves are estimated at over 2.6 million tons with a 10-30 percent sulfur content. Another 2.2 million tons of pyrite ores, with a 7-30 percent sulfur content, are also thought to be available. In 1965, sulfur and pyrite

production combined amounted to only 46,000 tons. Nearly 120,000 tons of sulfur were imported in 1965 at a value of \$5 million. Roughly 150,000 tons may be needed by 1968. Canada and the United States are the main suppliers and compete strictly on a price basis. The import duty was lowered in 1965 from 25 percent to only 10 percent. Imports are not restricted.

The Government is considering means of encouraging sulfur and pyrite mining so as to reduce import dependency. However, domestically produced sulfur cannot compete on a price basis with imported sulfur because of the high recovery costs using low grade ores. Some thought had been given to setting up beneficiation facilities for pyrite ore, but no action has yet been taken. The recent import duty reduction suggests that the Government may slow down its efforts to develop the local industry. The prospect is, therefore, for increased sulfur imports and limited demand for sulfur producing equipment.

Copper, the only metallic ore of industrial value found in Taiwan, is mined almost entirely by the State-owned Taiwan Metal Mining Corporation (TMMIC) in the Chin Kua Shih mine near Keelung. The ore in that mine averages only about 0.7-0.8 percent copper, possibly the lowest grade copper ore mined anywhere in the world. Reserves are estimated at 5.7 million tons, but total output in 1965 was only about 1,900 tons. Most of TMMIC's copper—in the form of flotation concentrate—is shipped to Japan for smelting and refining and then reimported as electrolytic copper. Little or no copper ore is imported; however, the amount of electrolytic copper obtainable from local ore is hardly adequate, and this material must be largely imported.

TMMIC has recently announced plans to build a \$5-million integrated copper plant. As part of this project, mining activity will be intensified to increase the supply of ore. This should present opportunities for the sale of such mining equipment as sharpeners, rock drills, electric locomotives, and mine cars as well as equipment for making copper concentrate such as crushers, classifiers, thickeners, filters, and flotators. (For further details on copper development, see discussion under "Base Metals Industry.")

Since no other metallic ores of industrial value are native to Taiwan, they must be imported. Except for the aluminum industry and to a minor extent the steel industry, none of Taiwan's metal processing industries are integrated. Ore reduction facilities are therefore rather limited. Thus, raw material demand is greater for scrap and unworked metals than for ores. Metallic ore imports in 1965, excluding bauxite, amounted to 56,000 tons worth about \$300,000. These consisted mostly of iron, manganese, and hematite ores from Malaysia. There will not be a marked in-

crease in the demand for iron ores unless the large integrated steel mill, now being considered, is finally constructed. Bauxite, on the other hand, is in great demand because of rapid development of the aluminum industry. Bauxite imports, also supplied by Malaysia, reached 105,000 tons valued at \$1.1 million in 1965. There are no import restrictions on any ores, and the duty is 5 percent.

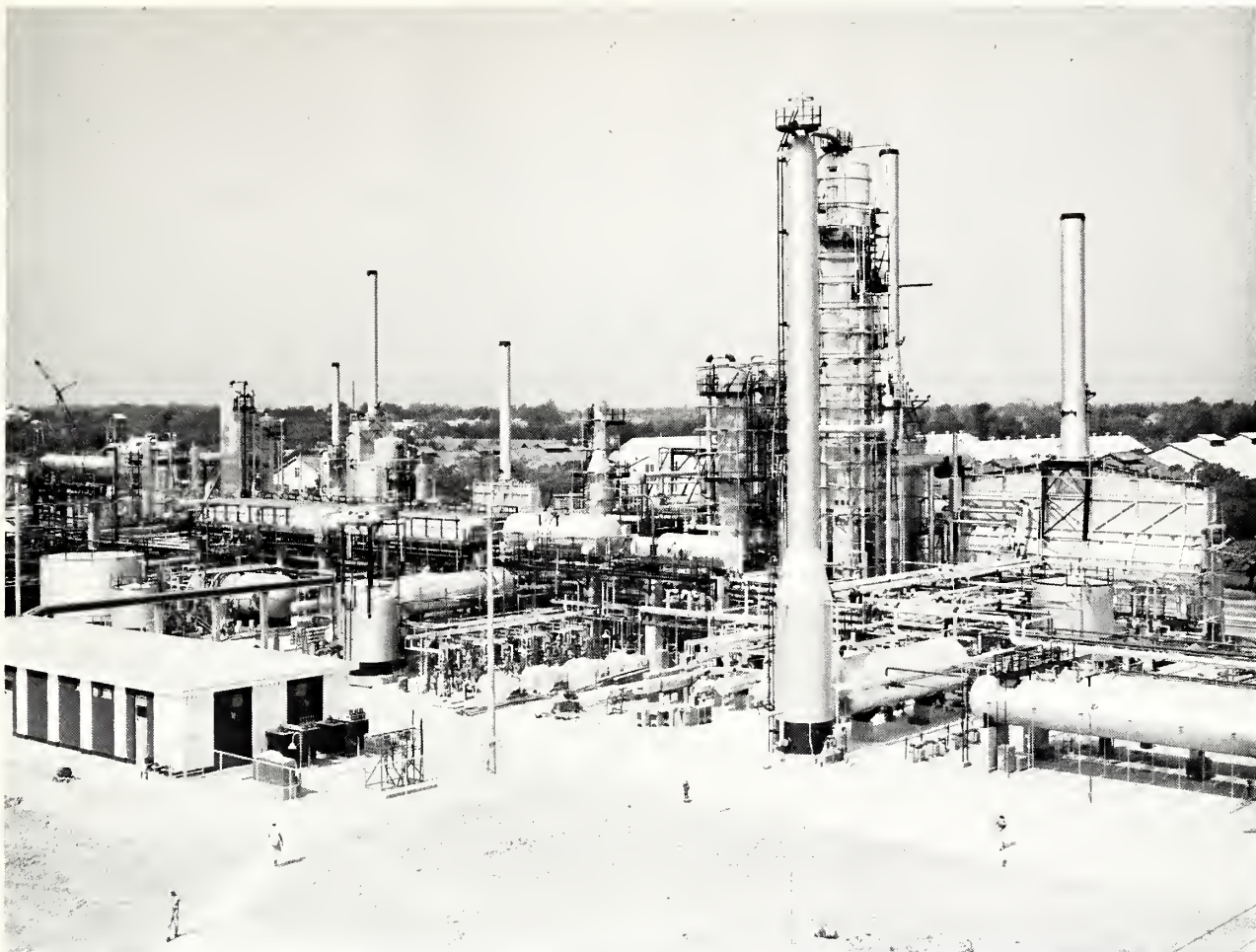
### *Petroleum and Natural Gas*

Taiwan has abundant natural gas, some crude oil potential, and a highly developed, modern refinery. Rapid growth of the petroleum industry is assured. The State-owned Chinese Petroleum Corporation (CPC) is the sole producer and distributor of petroleum and petroleum products in Taiwan. Its oil and gas wells are concentrated around Miaoli along the central western coast, and the refinery is located at Kaohsiung in southwest Taiwan.

The import market for refined petroleum products is somewhat limited at present. CPC can already meet most domestic requirements and is beginning to export. However, plans are underway to construct two new oil-fired thermal power plants after 1969, and heavy imports of fuel oil will be needed for that purpose unless substantial expansion of refinery capacity is undertaken.

Local output includes automotive and aviation gasoline, jet fuel, diesel oil, kerosene, naphtha, reformate, liquefied petroleum gas, and refinery gas. Excluding lubricating oil, about \$1.3 million worth of these items were imported in 1965, mostly fuel oil, lubricating grease, and transformer oil from Iraq, the United States, and Japan. Imports of lubricating oil, still quite heavy in 1965 (7.6 million gallons worth \$3.1 million) may no longer be necessary after 1966. A new lubricating oil plant with a 23-million-gallon annual capacity, built jointly by CPC and the Gulf Oil Company in May 1965, should satisfy local needs and provide a large exportable surplus. The United States and Japan have been the principal suppliers of lubricating oil.

To keep pace with rising domestic requirements, CPC plans to expand production of all refined petroleum products. Local civilian consumption in 1965 totaled about 32 million gallons, 54 percent over 1964. Some expansion of refinery capacity will therefore be necessary, particularly for fuel oil. Present facilities at the Kaohsiung refinery include 3 topping units, a visbreaking unit, 2 hydrodesulfurization units for gasoline and distillates, a light end superfractionation unit, 2 catalytic reforming units, a catalytic cracking unit, an alkylation unit, a sulfur recovery unit, a sulfuric acid plant, and an asphalt plant. Within the next 2 years, CPC will add a new 50,000



**TO FILL THE NEED:** growing industries need lubricating oil, so the China Gulf Oil Co. built this \$11 million plant to furnish China's factories and trucks with 1,500 barrels per day.

barrel-per-day topping plant to increase production of fuel oil from the present 400 million gallons to 750 million gallons annually.

Most of the equipment needed for the topping unit can be made locally. However, pumps and instruments will have to be imported.

Imports of oil refinery equipment fluctuate sharply from year to year in line with CPC expansion programs. The United States, however, generally supplies this equipment.

Increased production of refined products will also require greater imports of crude oil. CPC's refinery now has an annual crude capacity of 42.2 billion gallons. Local crude production for the entire year of 1965 was only 20,800 tons. Crude oil imports are substantial, totaling more than 1.4 million tons worth \$22.1 million in that year from Iraq and Iran compared with 1.1 million tons worth \$19.3 million in 1960.

CPC, in the hope of finding crude oil on Taiwan, has been conducting petroleum explorations there

since 1949. Some crude oil has been found in Miaoli, Chiayi, and Tainan. A new well at Chutung will raise annual output to a mere 4 million gallons from 20 oil-producing wells.

Despite the small success so far, many geologists believe that substantial reserves are on the island and that systematic explorations should continue. Taiwan lies in the same geological belt as the important oil producing areas in the Far East. Favorable structures and possible oil traps have been discovered through geological study and seismic survey, and many oil and gas seepages have been reported.

Encouraged by the prospect of finding oil, CPC will intensify its geological study by continuing mapping and aerial surveys; surface, subsurface, and sedimentary studies; micropaleontologic research; stratigraphic evaluation and by geophysical prospecting including gravimetric, magnetic, and seismic surveying. More elaborate drilling programs that require deep-well drilling rigs procured from abroad will be undertaken. In late 1965, CPC applied to the U.S.

Export-Import Bank for a \$4 million loan to finance import of drilling equipment. The deepest rig now in use goes to a depth of 15,000 feet with 4½" drill pipes. So far, all CPC's drilling equipment has come from the United States, and more opportunities for the sale of U.S. equipment should develop. Imports are free of duty.

CPC's oil drilling bore unexpected results in 1959 and 1963 when huge natural gas deposits were found near Miaoli. Reserves of at least 5.3 trillion gallons have been proved and an additional potential of 7.9 trillion gallons is estimated. Most significantly, available reserves are believed sufficient for developing a large scale petrochemical industry as well as for use as a household and industrial fuel. With these aims in mind, CPC has increased its production of natural gas from only 9.8 billion gallons in 1961 to 81.8 billion in 1965. As of 1965, 21 natural gas wells were in operation. Greatly expanded drilling activity is already planned. CPC also has plans to build a \$1.5 million natural gas treatment plant which will require imported equipment.

Other opportunities are anticipated for the sale of oil and gas distribution facilities. CPC wants to import and install a \$1-million oil-unloading buoy in the Kaohsiung harbor and is considering a \$20-25 million gas pipeline system running from Miaoli to Kaohsiung in the south and from Miaoli to Hsinchu and Keelung in the north. Both lines will use 20" high-pressure steel pipe, and heavy equipment rather than hand labor will be used to install it. In the future, branch lines will be laid to Tainan, Taichung, and other industrial areas where large fuel quantities are consumed. At least \$12 million of the total project cost will be for imported pipe, control meters, and other equipment and services.

### ***Petrochemical***

With the discovery of natural gas in 1959 came hope that Taiwan could develop a petrochemical industry. Then, with the addition of catalytic cracking and catforming units at CPC's Kaohsiung refinery and the establishment of an aromatic solvent works at Chiayi, actual production of petrochemical intermediates and of some end products became feasible for the first time. This industry presently dominates much of the Government's future economic development plans and has attracted some of the largest American investments ever to come to Taiwan.

CPC can now supply the five basic petroleum materials needed to produce petrochemical intermediates—natural gas, refinery gas, liquefied petroleum gas, naphtha, and reformate. Other locally available raw materials include coal tar, naphthalene, molasses, and calcium carbide. Although Taiwan is a long way from self-sufficiency in petrochemicals and intermedi-

ates, that era at least can be envisioned. At this stage, however, nearly all intermediates, as well as some intermediate raw materials, are imported. Over \$13 million worth were imported in 1965, of which the U.S. supplied about \$6 million, and demand is increasing rapidly.

Some local production of petrochemical raw materials has begun, but on a limited scale. Output includes acetylene, vinyl chloride, and vinyl acetate for PVC; urea and ammonia for fertilizer and resins; phenol and formaldehyde for resins and adhesives; dodecyl benzene for detergents; ethyl alcohol for alcoholic beverages, solvents, and acetic acid; and some benzene, toluene, and xylene for solvents and synthetic resins. Of these, only mixed xylenes are imported in quantity. Imports of the xylenes are not restricted. The duty is 20 percent.

Raw materials not produced locally that are imported in quantity include methanol, phthalic anhydride, and styrene. Methanol and phthalic anhydride are both dutiable at 10 percent while styrene is subject to a 25 percent duty. Imports are not restricted.

Intermediate petrochemicals not produced locally that are imported in substantial quantities include dioctyl phthalate (DOP), dibutyl phthalate (DBP), polyethylene, polypropylene, caprolactum, ethylene glycol, and dimethyl terephthalate (DMT). Polystyrene is now being produced locally, but imports are still required. The synthetic resins are generally dutiable at 25 percent and the phthalates at 20 percent. There are no restrictions.

Acetone, methyl ethyl ketone, methyl isobutyl ketone, acetaldehyde, butyl alcohols, chlorinated solvents, and maleic anhydride are not produced on Taiwan but the demand for them is limited.

Several large new projects for making petrochemicals are now under study, and some are already being built, mostly with U.S. private capital. They include two new methanol plants; new facilities for aromatics extraction, dealkylation, isomerization, and separation; a new naphtha cracking unit; and new polyethylene, caprolactum and DMT plants. Though their output would gradually replace imports over the long run, the projects will involve substantial imports of new machinery and equipment and thus provide excellent sales opportunities for U.S. equipment suppliers in this field. The best approach is through investments or licensing agreements. For further details on petrochemical consumption by the plastics and manmade fiber industries, see pages 44 and 48, respectively.

### ***Forest Products***

Taiwan's forest products industry has enormous potential. Inaccessibility to the quality conifer timber has prevented the island's vast resources from being

developed effectively. Nevertheless, logging, lumbering, and wood manufacturing has expanded rapidly, as is reflected in the growth in exports of lumber, timber, and manufactures from \$5.5 million in 1960 to \$44.2 million in 1965. Further increases in production and exports are anticipated and should open up excellent opportunities for selling machinery and equipment to saw mills, wood manufacturers, and furniture makers.

On the other hand, as more local timber is felled and processed, the market for imported wood will gradually decline. Only those wood species not grown in Taiwan, such as lauan for the plywood industry and high-quality specialty woods for the furniture industry, will find a growing market. Imports of lauan logs reached nearly \$17.4 million in 1965 compared with only \$3.5 million in 1960, reflecting the recent spectacular growth in plywood production. Only \$145,000 worth of other wood was imported in that year.

Taiwan's forests cover 55 percent of the total land area or about 5.3 million acres. Growing stock is estimated at 239 million cubic meters. Much of the timber is not readily accessible, and several of the more valued species are not grown in abundance. Over 60 percent of total standing timber is in relatively low value hardwoods and bamboo. About 40 percent is in conifer woods, but only a quarter of these can be reached and logged economically. Among the important species in which Taiwan is self-sufficient are bamboo; conifers including red and yellow cypress, hemlock, and several varieties of spruce and pine; and hardwoods, for example acacia, camphor, oak, zelkova, michelia, and cryptomelia. Woods not grown in quantity and which must be imported include lauan, seraya, sandalwood, teak, mahogany, walnut, and corkwoods. Import duties range between 25 and 35 percent.

The Government hopes to develop additional timber varieties through its reforestation and afforestation programs. It is also encouraging the lumber and woodworking industries to substitute local wood for imported wood wherever feasible. However, the impact of these developments on lauan and specialty woods imports will hardly be felt since there are no satisfactory local substitutes in the quality and amount needed by plywood and furniture manufacturers. On the other hand, local woods can be used increasingly in the construction and pulp and paper industries and for producing railway ties, coal mine props, garden tools, boats, pencils, and matches.

Timber logging is done by 3 Government agencies and 10 private companies mainly in the high, rugged areas of the central mountain range. Total timber cut in 1965 was 1.1 million cubic meters compared with only 822,300 cubic meters in 1960. Felling and

slicing are done with hand tools. Power chain saws and truck logging facilities are being introduced by Government loggers, but the rugged terrain limits their effectiveness. The private concerns are still using primitive hauling methods such as wooden sleds and narrow gage (19.7") railtrucks powered by human labor. In steep mountain areas, light, gravity operated cableways are occasionally used.

There are more than 650 saw mills on the island, all but 15 of which are privately owned. Only Government mills and about 10 private mills use modern high-speed equipment and produce in quantity. All the other private mills are small operations averaging less than 100 cubic meters production daily. A typical electric powered mill has one or two 42"-49" band headsaws with a cable powered carriage, 2 or 3 38" band resaws with logs pushed through by hand, and 2 or 3 swing-type circular saws for crosscut and trimming.

Taiwan's subtropical, humid climate exposes local timber to decay and worms, and wood processed into railway ties, poles, mine props, and construction lumber must be chemically treated. Coal tar creasote is generally used for exterior lumber while pentachlorophenol is most often used for interior lumber. Both preservatives are locally produced. The creasote treatment plants are fairly modern and are equipped with U.S.-made full-cell and empty-cell pressure treating facilities.

Plywood manufacture is by far the most important forest product industry in Taiwan. It is also the most prodigious consumer of imports. Limited production of plywood first began in 1958. By 1960, Taiwan was producing about 110 million square feet and by 1965, 347 million square feet. Roughly 90 percent of the output is exported, earning \$26.4 million in 1965. There were 15 plywood factories on the island making plywood sheets, flush doors, flooring blocks, furniture parts, and prefabricated window frames.

Although softwood is generally used in the United States to make plywood, Taiwan's industry uses hardwood and must import all of it, mainly Philippine lauan logs. Local cypress is also used to some extent, but the cost is high. Virtual Philippine control of lauan log supply poses a potential threat to Taiwan's industry. It is conceivable that the Philippines will some day want to curtail its export of lauan to competitive industries in Taiwan, Japan, and other countries. Taiwan will then have to look elsewhere for its log supply, possibly North Borneo. The Government would prefer, of course, to develop a local substitute and therefore is promoting the use of teak, spruce, and hemlock as possibilities. Logs may only be imported by end users (e.g. manufacturers). The duty is 25 percent. Resin and glue requirements are met locally with urea resin and phenolic resin glue.





Plywood factories are generally well equipped with modern production facilities in order to maintain adequate quality control for export. Machinery includes cross-cut chain saws, automatic electric dimension saws, rotary lathes, veneer slicers, automatic clippers and veneer dryers, glue spreaders, cold and hot presses, scrapers and sanders, miscellaneous woodworking machinery, and temperature and humidity control instrumentation. Nearly \$1 million worth of plywood and laminating plant machinery and parts were imported in 1965. No import restrictions apply. Japan and Germany have been the leading suppliers, although some U.S. and local machinery is being used.

The artificial board industry is relatively new, but because of marketing difficulties and competition from plywood, its growth has been slow. Six plants are now operating. Four use local bagasse to produce bagasse hardboard, insulation board, and acoustical tile, and two are using wood waste, resin, and wax to produce particle board. No raw material imports are required.

Bagasse board is made either by the wet pressing process or the combination process. With the former, the wet board formed is directly hot-pressed and dried into hardboard. In the combination process, the wet board is first dried into insulation board (sometimes sold as such), and further compressed under high temperature and pressure into two-sided, smooth, high-grade hardboard. Digesters and beaters are locally made, but the refiners, the board forming and drying machines, and the hot presses are imported. The United States is the leading supplier of such equipment. Production of bagasse board rose from 2.7 million pieces in 1960 to 3.3 million pieces in 1965.

The two particle wood shaving-board plants use a dry process, mixing shavings with synthetic resin and wax under heat and pressure. Most of the machinery is imported including wood shaving machines, dryers, glue mixers, forming stations, prepresses, hot presses, and sanders. Germany, Japan, and the United States are the main suppliers. There are no import restrictions on any of the machines used.

The woodworking industry represents a modest but growing market for imported machinery and, to some extent, high quality woods. Woodworking, particularly furniture making, is an ancient art among the Chinese, and there are probably more than 2,000 furniture craftsmen throughout Taiwan.

Most of their shops are not mechanized and almost all work is done with hand tools. However, the Government is encouraging the development of a mechanized furniture industry, and this could well generate

demand for certain types of woodworking machinery.

There are now only about ten large woodworking factories in Taiwan producing furniture, flooring, parquet, window sashes, flush doors, and precision shuttles and bobbins for textile looms. Local cypress and camphor wood are mainly used, along with local and imported teak. High quality mahogany and walnut are also imported. Other furniture woods, now under import control, are being considered for import to improve the quality of locally made furniture. The large factories are generally equipped with planers, jointers, drill press, surface scrapers, routers, carvers, radial saws, borers, dovetail machines, shapers and single-end tenoners, with 7- to 10-cubic meter compartment kilns. As new factories are set up, each would require an estimated \$150,000 worth of machinery to equip a 10,000-square-meter plant. Although some of the common machines can be made locally, most of them will have to be imported. U. S., Japanese, and German equipment is preferred.

### *Pulp and Paper*

Taiwan's pulp and paper industry, with rich fibrous raw materials to draw upon, has excellent potential for expansion. However, rapid progress has been hampered by the inaccessibility of conifer pulping wood, the high cost of logging hardwoods for pulping, the small scale of most pulp and paper mills, antiquated machinery and equipment, low-quality output fit only for local consumption, and overproduction of certain paper. Improvement and development of the industry is on the Government's top priority list.

Considering the present high level of literacy (above 90 percent), the country's comprehensive education program, and the expanding industrial sector, one can expect a substantial increase in internal demand for paper and industrial packaging materials and increased production of these items. Taiwan's per capita annual consumption of paper and paper products in 1965 was about 28 lbs. To permit the necessary increase in production, there will have to be a sizable increase in imports of wood pulp and waste paper over the next several years, as well as some additional imports of pulp and paper making machinery. Taiwan is already self-sufficient in production of nonwood pulp including bagasse, rice straw, and bamboo pulp; of chemical raw materials such as caustic soda and chlorine; and of most paperboards, paper, and paper products. Certain specialty papers, however, will still have to be imported.

There are some 72 pulp and paper mills now in Taiwan, almost all small. Only four have a daily output of more than 30 tons; 55 have a daily output of under 10 tons. Most of the mills are using the simple soda process for making pulp. Fewer than 5 mills are using the Kraft process or acid sulfite pulping process,

**VERSATILE SHIHMEN DAM: it's used for flood control, power generation and water supply.**

and none presently uses the Sutherland Kraft, bisulfite, neutral sulfite, chip ground, or chemiground process. There is, however, particularly strong interest in utilizing the 2-stage bisulfite process for bleaching pulp. The attractiveness of this method is heightened by the development in the United States and Canada of the ion exchange recovery process and the Atomized Suspension Technique (AST) for chemical recovery of soda and sulfur from bisulfite. Improvements and expansion in these directions are good possibilities for the future, and foreign participation would be well received.

Pulp production is confined mostly to bagasse, rice straw, and bamboo pulp since these raw materials are all locally available and relatively inexpensive. The pulp quality, of course, is far poorer than can be obtained from using wood as the raw material.

Very little wood pulp is manufactured in Taiwan despite the island's vast forest resources. In fact, only two mills currently use wood as a raw material for chemical pulp. Conifers, which make the best quality pulp, are generally inaccessible and too costly to log in sufficient quantity. Only pine saplings for ground-wood pulp and hemlock for sulfite pulp are used to any extent. Hardwoods and mixed hardwoods are abundant but seldom used since their fiber is similar to that of bagasse, which is cheaper and more suitable for use in the many small soda-process mills. There is no production at all of unbleached Kraft pulp.

Pulp production in 1965 was about 38,200 tons. Taiwan can presently meet all its requirements for bagasse, rice straw, and bamboo pulp, but only 40 percent of its wood pulp needs. The balance of the wood pulp requirement, mostly kraft and sulfite pulp, is imported. Wood pulp imports will almost certainly increase, for local production capacity is expected to lag further and further behind demand, particularly as the need for strong packaging papers made from wood pulp grows.

Taiwan can now supply all its current coniferous groundwood pulp needs. However, the island's maximum groundwood pulp capacity is only about 21,000 tons, and consumption requirements will probably go beyond that by 1972. Thereafter, groundwood pulp will have to be imported.

The current white wood pulp capacity is already at its maximum, about 10,000 tons, and still cannot fully meet local requirements. Roughly 8,000 tons were imported in 1965. By 1968, an estimated 23,000 tons of white pulp will be needed, of which about 13,000 tons will have to be imported. As there is no local production of unbleached wood pulp, the entire requirement must be imported. Imports of 23,000 tons were needed in 1965, and by 1968 about 39,000 tons may have to be imported.

The value of these wood pulp imports is consider-

able, and increasing rapidly. From 1960 to 1965, wood pulp imports rose from \$2.1 million to \$5.2 million. The United States and Canada are the leading suppliers of sulfite pulp, the main pulp import. Only end users may import pulp; the duty is 10 percent. The Government has been urged by foreign experts to eliminate the duty as a means of stimulating healthier development of the paper industries, but as yet no action has been taken.

The use of long fibered waste paper as a possible substitute for wood pulp is gaining popularity (particularly for the production of chip board and bottom liner for folding box board). Imports of waste paper in 1965 amounted to over \$850,000, compared with only \$4,000 in 1960. Further increases are likely. The United States is the main supplier, mostly of over-issue news. Imports are not restricted, and the duty is 10 percent.

Taiwan is more or less self-sufficient in production of paperboard and most paper and paper products. Paperboards now being manufactured include manila board, kraft liner board, strawboard, corrugated medium board, chipboard, and matrix board. Total imports of paperboard in 1965 amounted to only \$465,000, with Japan and the United States the principal suppliers.

Although a wide variety of papers are produced, the industry has concentrated heavily on newsprint and other printing papers, (art, printing and poster paper, woodfree printing paper, book paper, blueprint paper) and a few grades of fine paper such as bond and manifold paper. These are all, in fact, being overproduced, with adverse financial consequences. Other papers in which Taiwan is more or less self-sufficient include box cover paper, catalog paper, envelope paper, magazine paper, pamphlet paper, periodical paper, and ticket stock, among printing papers; fine Bristol stock, drafting, ledger, menu, postage stamp, school, text, and writing paper; coarse asphaltting, bag and sack, and all grades of wrapping paper; and some tissue papers, for example wrapping tissue and toilet tissue stock.

Imports are, however, still depended upon for document bond paper, drawing paper, bank note paper, high quality cigarette paper, coated paper, wallpaper, some carbon paper, glassine paper, adhesive paper, postage stamp paper, paper yarn, and some tissue writing and printing papers. Total imports of these items in 1965 reached nearly \$3 million, compared with about \$1 million in 1960. Japan is by far the leading supplier even though U.S. papers are recognized to be of superior quality. Norway and Sweden (tissue paper) and France (cigarette paper) are also represented. Price, rather than quality, appears to be the decisive sales factor.

In the long run, Taiwan may again become a sub-

stantial importer of paper and paperboard. It is estimated that by 1974, Taiwan's paper production capability could fall behind the amount needed for internal consumption and export. Present production capacity for paper and paperboard is about 160,000 tons. Expansions planned within the next 2 years will boost capacity to about 300,000 tons, which is probably the maximum attainable under foreseeable raw material conditions. However, by 1973, total consumption and export requirements are expected to reach the 300,000 tons that can be supplied locally. Thereafter, imports of paper and paperboard will be increasingly necessary unless new and better wood pulping facilities are established.

Taiwan is greatly in need of new pulp and paper making machinery to modernize existing facilities and to accommodate planned expansions in production capacity. Since many of the 72 paper mills have integrated pulp and paper facilities, they will be needing both pulp making as well as paper making equipment. Only one plant, the Taiwan Pulp and Paper Corporation's (TPPC) large Hsinying operation makes pulp (bagasse) alone, while about 21 small firms make only paper and paper products.

Machinery and equipment now installed at the 72 plants include 22 stationary digesters, 128 rotary spherical digesters, 13 rotary cylindrical digesters, 1 open aquabrusher and 1 asplung difibrator for pulp making; and 17 Fourdrinier, 4 Fourdrinier yankee, 33 cylinder, 90 cylinder yankee, and 19 cylinder board machines for paper and paperboard manufacturing. Only 2 roll grinders are installed.

Expansion projects in the planning stage which will require additional machinery and equipment include a doubling of bagasse pulp capacity and new production of coated papers at the TPPC Hsinying plant, increased production of high quality manifold paper and other papers of industrial use at TPPC's Tatu plant, a new kraft pulp plant of 100 to 150 tons per day capacity at the Chung Hsing Paper Corporation's proposed mill at Hualien, increased production of kraft paper at Chung Hsings's Lotung Plant, and a new plant of the Pao Feng Industrial Company to produce 10,000 tons of corrugated paper annually.

As there are only four manufacturers of paper mill machinery in Taiwan, much of the new heavy equipment requirements will have to be imported. One local firm can cast a yankee paper machine dryer up to 120" wide and 10' in diameter, and another can make paper machines up to 84" wide and board machines up to 76". The other firms are producing chippers, screens, pumps, bleach plant equipment, refiners, pulpers, agitators, beaters, head boxes, regulators, widers, lay boys, trimmers, sheeters, cutters, and baling presses.

Imports of pulp and paper machinery, largely supplied by Japan, the United States, Germany, and Sweden, rose from \$482,000 in 1960 to \$1.8 million in 1965. Recognized to be of superior quality, U.S. machinery is higher priced than that of competitive suppliers. The best avenue for increased U.S. machinery sales would be through joint ventures or licensing agreements with the larger pulp and paper manufacturers. There are no import restrictions on machinery. The duty is 12½ percent.

### *Leather*

Taiwan has nearly 100 tanneries and 200 or more firms engaged in manufacturing of shoes, gloves, handbags, belting, and other leather products. Most of them are very small operations which use hand labor. The quality of the products is usually not high enough to merit exporting, and the local market is too narrow to warrant significant expansion.

The leather industry is heavily protected, and imports of most leather and leather products are controlled. Only cow hides for making upper and sole leather are imported in substantial quantity, over \$1.7 million worth in 1965. The raw hide market will continue to grow, as Taiwan's policy of protecting draft cattle severely limits the number of oxen which can be slaughtered. The United States and Thailand are the principal suppliers of hides. U.S. hides are preferred for sole leather and Thai hides for upper leather. The import duty on hides is 15%. Leather belting and roller leather imports are also permitted, but imports are negligible. The duties are 40% and 10% respectively. Taiwan is self-sufficient in most other leather products, including upper and sole leather, patent leather, leather manufactures and hogskin. High-grade upper leather, however, must still be imported, owing to inferior tanning techniques used in Taiwan.

Tanning compounds are mostly imported, averaging \$200,000-\$300,000 a year. South Africa and several Asian countries are the leading suppliers, although some resins and oils come from the United States. Imports are not restricted, and the applicable duties on tanning agents range from 20-25 percent. To increase locally available tanning materials, Taiwan will plant more tannin-yielding trees and will use the tanning extract in conjunction with chemical tanning agents made from spent liquor produced in sulfite paper pulp plants. Also, research into utilization of chromium salts will be undertaken.

Machinery for tanning, leather processing, and shoe manufacturing is imported, but in negligible amounts. German tanning equipment is usually preferred, while the United States has been able to supply some shoemaking machinery. There are no restrictions on imports. The duty is 15 percent.

## Rubber

Though relatively small, Taiwan's rubber products industry is overproducing, and imports of rubber products are tightly controlled. However, Taiwan has no crude rubber resources, and all natural and synthetic rubber must be imported. Many of the chemicals used in the manufacture of rubber products are also imported. With some exceptions, machinery is locally produced, and overall imports of rubber processing equipment are limited.

Established in the early 1950's, the rubber industry grew very rapidly until about 1962, when it began to level off as production caught up with local demand. In 1965, production value amounted to \$15.2 million. Further expansion of the industry will take place if new export markets can be secured. Some diversification is also a possibility, and this could generate increased demand for raw materials and some machinery.

There are now about 100 factories in Taiwan producing rubber products, including tires and tubes, shoes and boots, belting, insulated wire and cable, sheeting, hose and tubing, foam rubber, and reclaimed rubber. In 1965 total imports of these items excluding tires and tubes amounted to \$500,000 and came mostly from the United States and Japan. Taiwan can also produce much of its tire and tube requirements including the following sizes whose importation is restricted, 1000-20, 900-20, 825-20, 750-20, 700-20, 700-15, 670-15, and 600-10. Other sizes, although they are being locally made in larger quantities, must still be imported. Imports of tires and tubes in 1965 amounted to about \$58,000, with the United States and Japan the principal suppliers. Import duties on most rubber products are 40-50 percent.

The industry's consumption of imported crude and synthetic rubber is over 800 tons a month. Imports of natural and synthetic rubber in 1965 were valued at \$3.4 million and \$1.5 million, respectively. Synthetic rubber comes mainly from the U.S. and Japan, while natural rubber is bought mostly from Malaya, Singapore, and Vietnam. There are no restrictions on imports. Duty on both natural and synthetic rubber is 15 percent. All crude rubber is procured by the Taiwan Supply Bureau for end users.

Rubber chemicals which must be imported include accelerators, antioxidants, stearine, lithopone, titanium dioxide, pigments, carbon black, and pine tar. Imports of rubber accelerators and antioxidants were valued at \$305,000 in 1965. Imports of the other chemicals cited are fairly substantial, but are principally for consumption by the paint and other industries. Taiwan can already produce sufficient zinc oxide, calcium carbonate, solvent, naphtha, paraffin, and other chemicals used in the rubber industry.

Almost all rubber processing machinery can be

made locally, including rubber mixing mills with sizes ranging from 24' to 8' in diameter. The most common size is 12' diameter. Imported equipment is confined to chilled casting rolls, Bambury mixers, and friction calendars. Japan is the main supplier. Imports in 1965 were only valued at \$120,000. The duty is 12½ percent and there are no import restrictions. Most of the testing equipment has also come from Japan because of greater familiarity and, to some extent, lower prices.

## Plastics

Within 4 years, Taiwan could become one of Asia's major producers and exporters of thermoplastics and fabricated articles. Today the island produces only PVC resins and compounds; urea formaldehyde and phenol formaldehyde resins; and fabricated articles of PVC, polyethylene (PE), polystyrene (PS), and a few others. Large imports of raw material such as methanol, plasticizers, and PE and PS resins are still required. However, new plants under construction or being considered for the near future could make the island self-sufficient in all plastic raw materials by 1968 or 1969. In the meantime, imports should increase very rapidly to keep pace with rising output of processed articles.

Taiwan's plastics industry is following the same pattern of extremely rapid initial growth seen earlier in Japan and Hong Kong. Unlike Hong Kong, which exports most of its production, Taiwan has strong internal demand as well as export potential. Since plastics can be produced cheaply in Taiwan, they substitute readily for many of the more costly rubber, leather, textile, and even metal products. Hence, total thermoplastics consumption for local and export use should increase much faster than in Hong Kong.

This trend is already strikingly evident. For example, consumption of PVC, PE, and PS in 1961 was only about 14.5, 2.8, and 0.8 million pounds, respectively. In 1964, it had increased to 51, 22, and 2.7 million pounds. By 1968, the total requirement could reach about 132, 40, and 4.5 million pounds. All the PE and most of the PS will still have to be imported until 1968, after which time production may become adequate. Imports of dicotylphthalate (DOP) and dibutylphthalate (DBP), the main raw materials for PVC, should approximate 20 and 4 million pounds, respectively, by 1968.

Taiwan's plastics industry, first established in 1957, turned out only 1,000 tons of PVC that year and exported only \$4,000 worth. By 1965, the island was producing 25,300 tons and exporting over \$2 million worth of PVC resin and compound and a wide range of PVC, PE, and PS fabricated products. There are four major producers of PVC resins and compounds, but more than 300 plastics processing plants

have sprung up. Their output includes PVC film and sheet (tubes and pipes, belting, plates, tiles, netting, raincoats, shoes and slippers, garden hoses, phonograph records, window shades, folding doors, and air mattresses; PE bags, flowers, toys, dolls, bottles, containers, piping, hose, woven rope, shoes, helmets, and kitchenware; PS toys, toothbrush handles, kitchenware, and radio cases; polyurethane foam; acrylic plates, and some bakelite.

PVC is made by the Formosa Plastic Corporation and three new plants which were set up in 1966. By 1967 annual capacity will reach 36,500 tons.

The basic raw materials for making PVC—calcium carbide and hydrochloric acid—are available locally as byproducts of the alkali and fertilizer industries. Prospect exists for cracking CPC's liquified petroleum gas to obtain acetylene, but no efforts in that direction have yet been made.

From the PVC resin, Formosa Plastics makes both plasticized and rigid compounds, as well as copolymers and copolymer compounds. The plasticized compounds (70 percent of total production) requires about 500 tons of DOP, DBP, and other plasticizers for each 1,000 tons produced. Since no plasticizers are yet manufactured on the island, imports are substantial. About 17 million pounds of DOP and DBP, worth \$2.4 million, and another \$1.1 million worth of PVC chemicals, were imported in 1965. The DOP and DBP requirement could reach 20 and 4 million pounds respectively by 1968. Other phthalate plasticizers, such as DOP substitute (Messamol), epoxy plasticizer, tricresyl phosphate, diisooctyl phthalate, and diisodecyl phthalate, are less significant imports. The United States, Japan, and Italy are the main suppliers. Imports are not restricted. Duty is 20 percent.

After 1968, Taiwan may be producing its own DOP. Union Carbide Asia Ltd. is building a \$1.4 million plant to produce 50 million pounds of DOP a year and will begin operating in 1968. In addition, Formosa Plastics is constructing a 9.2-million-pound-a-year plant to supply part of its needs. The total output of these two plants should cover all the island's DOP requirement, and imports would begin falling off sharply by 1969. Both plants will have to import phthalic anhydride as the raw material, since none is produced locally. Imports of the latter have not been very great thus far, about 1 million pounds a year for making paint and alkyd resins, but they could go as high as 20 million pounds when the DOP plants begin producing. The Government believes local production of phthalic anhydride from *o*-xylene may become feasible once CPC adds a proposed mixed xylene separation unit to its Aromatic Solvent Works at Chiayi. However, this is a long-run prospect, and will not affect imports of phthalic anhydride during the next several years at least. No import restrictions

apply, and the import duty was reduced in 1965 from 20 percent to 10 percent.

Aside from PVC, urea and phenol formaldehyde resins are the only other plastic molding compounds made in Taiwan. The nine producers of the phenolic resins can meet the domestic requirement, as few firms are processing the materials into plastic articles. All the raw materials—urea, phenol and formaldehyde—are also locally available. Urea is produced from local natural gas by a U.S. firm jointly with CPC. Most of the urea goes for urea fertilizer, but an adequate supply is available for resin production. Phenol is made primarily by CPC from sulfonation of benzene and by another firm from local coal tar. Formalin is produced by two firms, using imported methanol. Methanol imports are heavy. In 1965 they totaled 24 million pounds worth \$800,000. By 1968, the methanol requirement may reach 50-60 million pounds, but two methanol plants being constructed could cut import needs to about 14 million pounds by that time. Japan and the United States are the main suppliers. Duty is 10 percent.

Since no PE or PS resins are yet produced locally, Taiwan's increasing fabrication of those plastics will depend entirely on imports until projected new plants are constructed in 1967. There are now about 70 processors of imported PE on the island.

About 75 percent of the PE resin imported into Taiwan is the conventional (high-pressure or low-density) type used for thin packaging films and injected molded plastic articles. Linear PE is used for heavy duty films and extruded plastics. Since PE is in heavy demand for packaging in the rapidly expanding food industry, its consumption should grow at a faster rate and eventually have a larger market in Taiwan than PVC. By 1968, the annual PE requirement should exceed 40 million pounds compared with 28 million pounds in 1965 and only 1.5 million pounds in 1960. The 28 million pounds imported in 1965 were valued at \$4.7 million and came mostly from the United States, Canada, Japan, and the U.K. There are no import restrictions. Duty is 25 percent.

Experts believe that a 40 million pound internal demand for PE could support local production of the resin. To assure raw material availability, CPC will borrow \$5.4 million from the U.S. Export-Import Bank to finance construction of a naphtha cracking unit by 1967 which will have an initial annual capacity of 50 million pounds of ethylene and 28 million pounds of propylene, as well as butadiene, benzene, and toluene. Anticipating a sufficient ethylene supply becoming available, American National Distillers and Chemical Corporation is constructing a \$15-million plant to produce 40 million pounds of conventional PE a year. Its completion in 1967 should then make Tai-

wan virtually self-sufficient in low density PE resin. Linear PE, however, will still have to be imported.

As with PE fabrication, Taiwan's PS processing industry is also growing rapidly. Until 1965, the industry had relied entirely on imported PS. Over 6.4 million pounds worth \$590,000 were imported in 1965, more than double the 1964 import of 2.6 million pounds and 8 times the 1962 level of 830,000 pounds. By 1968 the demand could reach 8-10 million pounds, but newly begun local production could replace most of the imports. Two plants were built in 1965 with a combined yearly capacity of 8 million pounds of PS resin. The United States and Germany have supplied most of the PS thus far. No import restrictions apply yet. Duty is 25 percent.

Most of the PS now consumed in Taiwan is general purpose type used for making plastic toys, toothbrush handles, and kitchenware. About 20 percent of total usage is of high-impact resin, while very little medium-impact resin has been needed. Greatly increased use of both general and high-impact PS should develop to supply plastic cases and parts for radio and TV assembly industry. PS foam was introduced in 1961 for soundproofing and insulation purposes. Annual consumption is now approximately 100,000 pounds.

The two PS plants established in 1965 are importing styrene monomer raw material and polymerizing it locally. To some extent, then, decreased imports of PS will be offset by rising imports of styrene, which also comes mainly from the United States. There are no restrictions. Duty is 20 percent. If internal demand for styrene becomes large enough, local production might be feasible. Sufficient amounts of ethyl benzene raw material to manufacture styrene should be available when CPC completes its planned expansion of naphtha cracking and mixed xylene facilities. Foreign investment is already being sought for a styrene plant. About \$1.5 million would be needed for a plant of 5,500 tons annual capacity, the estimated styrene monomer requirement by 1968.

The overall outlook for growth of the plastics industry is excellent. As indicated there should be increased production of fabricated plastic articles for export; increased production of PVC resin and compounds for local use and export; new production of DOP plasticizers for the PVC industry; new production of phenol formaldehyde, urea formaldehyde, and polyethylene and polystyrene resins for their respective processing industries; and new production of petrochemical raw materials and intermediates for making PVC, DOP, formaldehyde, polyethylene, polystyrene, and styrene. These developments will cause imports of phthalate plasticizers, polyethylene and polystyrene resins, styrene, methanol, and various plastic chemicals to decline eventually, though with-

in the next 2 or 3 years there will almost certainly be sharp import increases for all these raw materials.

Continued rapid expansion of the plastics industry will mean increased imports of machinery and equipment in both the short and long run. Nearly all the equipment required to construct and operate new PVC, DOP, polyethylene, polystyrene, styrene monomer, and other plastic raw material plants will have to be imported. The Government has already announced it would allocate large amounts of foreign exchange for this purpose. U.S. equipment suppliers should benefit mainly from the expansion of raw material producing capacity. The producers are pleased with their present U.S.-made equipment. They are aware of American superiority in chemical engineering technology, and in this instance they are financially strong enough to afford the best available equipment.

U.S. plastics fabrication machinery, on the other hand, is not well represented. Local processors are using mostly Japanese and German processing machinery, which is cheaper than the U.S. equipment. In addition, Japan appears to be able to deliver more quickly. Nevertheless, an aggressive marketing approach by U.S. firms could be effective. An American manufacturer who can tie in new product ideas and technology with the sale of machinery could develop a profitable business in Taiwan.

More than half the local fabricators use only injection molding machines. The large fabricators have extruding and rolling equipment as well. The small hand-operated injection machines with capacity of 2.5 ounces or below are made locally. About half have a capacity of 3 to 8 ounces and are either semi- or fully automatic. Some are made locally, but most are imported. Those injection machines with capacities of from 8 to 80 ounces are fully automatic and are all imported. There are about 20 local manufacturers of injection molding machines. The machines produced are not of modern design or very efficient, but the price is low enough to attract the smaller fabricators. Total imports of plastics manufacturing machinery amounted to \$3 million in 1965 and are not restricted. Duty is 15 percent.

### *Textile and Apparel*

Taiwan is a major producer and exporter of cotton textiles and apparel, and is rapidly developing its wool, rayon, polyamide, and polyester capability. Textile exports began in 1954 and were valued at only \$350,000 in that year. By 1960, they reached \$21 million and in 1965, \$65 million.

Fifteen years ago, Taiwan was a multimillion dollar importer of textile yarn, fabric, and clothing. Now, Taiwan can export all these products and imports are negligible. Import demand has shifted to-

ward primary raw materials and machinery, imports of which are prodigious and increasing. For example, raw cotton, raw wool and wool tops, manmade staple fibers and filament in 1965 exceeded \$66 million, more than double the 1960 import level of \$27.8 million. Correspondingly, general textile machinery and sewing and knitting machinery more than trebled from \$5.1 million in 1960 to \$18.6 million in 1965.

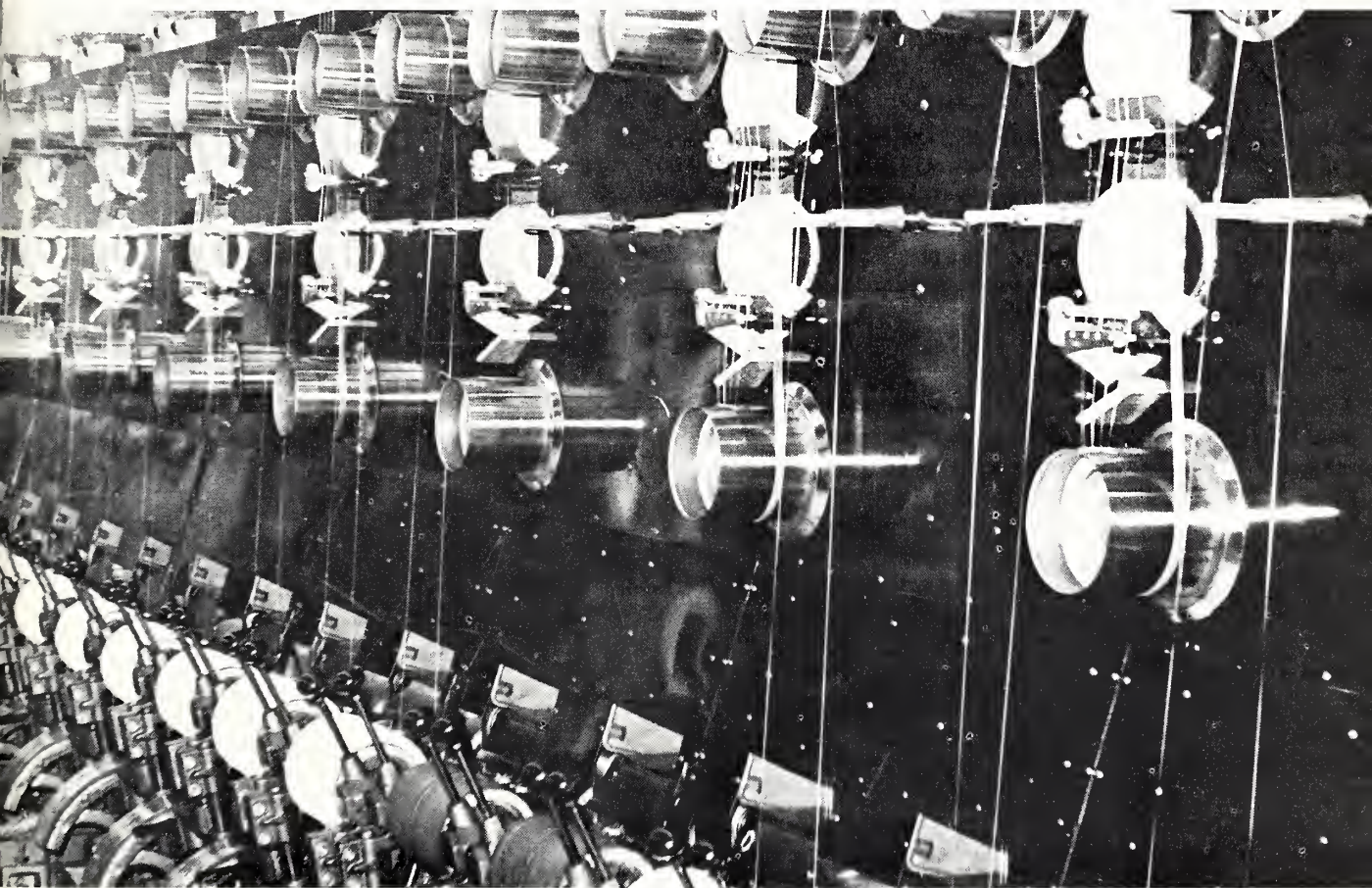
The cotton textile industry, Taiwan's largest export exchange earner after sugar, experienced phenomenal growth from about 1958 to 1962. Thereafter, further expansion of capacity, production, and export leveled off owing to voluntary export restraints. Future development of the cotton textile industry will continue to be more gradual and will emphasize renovation and modernization of existing facilities and production of diversified and high quality items. Main products of the industry now are yarn; ginghams; flannels; grey, bleached, and yarn-dyed piece goods; print cloth; corduroy and velveteen; children's wear; blouses and shirts; ladies' and men's slacks; knitted underwear; pajamas; handkerchiefs; and towels. Production amounted to 55,000 tons of yarn and 253 million

yards of piece goods in 1965, compared with 40,000 tons and 192 million yards, respectively, in 1960.

Cotton textile spinning and weaving capacity is substantial. In 1965, there were 527,000 spindles and 20,000 looms installed in more than 100 mills. However, about 20 percent of the industry is substandard. Many of the spindles are old and inefficient, and the majority of the mills have too few spindles to operate economically. Much new equipment will be needed, and to a large extent it will have to be imported. On the other hand, some mills, particularly the vertical plants, are fully equipped with the most modern automatic machinery. If additional expansion of capacity takes place, it will probably be undertaken by the vertical mills, which are well financed and will then be in the market for the latest type of equipment. Japanese, German, and Swiss suppliers have provided most of the equipment, generally quoting lower prices and longer term credit than U.S. suppliers.

Raw cotton is not grown sufficiently in Taiwan and must be imported in substantial quantities. Imports in 1965 amounted to 285,000 bales (500 lbs. each)

**NOTHING BUT THE BEST:** the latest in equipment reflects the newness of the United Nylon Corporation's factory, which was completed and began turning out nylon-6 in late 1964.



valued at \$36.2 million. The United States is the major supplier, mostly of middling cotton, followed by several countries in Central and Latin America.

The more modest wool textile industry has also enjoyed considerable expansion, but unlike the cotton textile sector, anticipates further rapid growth. The industry's product mix includes woolen and worsted yarn, worsted knitting yarn, woolen and worsted fabrics, wool gloves and sweaters, and, beginning in 1965, wool tops. Production in 1965 amounted to 7.8 million pounds of woolen and worsted yarn and 6.4 million yards of woolen serges, compared with only 1.5 million pounds, and 1.8 million yards, respectively, in 1960. Exports of yarn and fabric in 1965 were valued at \$5 million.

The industry has been totally dependent on raw wool imports, supplied mostly by Australia, New Zealand, and Japan. In 1965, imports of raw wool amounted to 7.6 million pounds valued at \$6 million. Until 1965, wool tops were also a major import; in that year they amounted to 4.3 million pounds at \$5.4 million. Australia and Japan were the main suppliers. In 1965, two wool top plants were built whose combined capacity is nearly 8 million pounds a year, to make Taiwan virtually self-sufficient in wool tops.

As for machinery and equipment, there were 44,600 spindles and 600 looms in operation in 10 mills in 1965. Spindle capacity alone has more than trebled since 1956, when it totaled 11,150. Further expansion is expected. Most of the machinery has come from Japan, the United States, Germany, and Switzerland. Very little can be produced locally. There are no import restrictions; the duty on all textile machinery is 15 percent.

By far the most promising of Taiwan's textile industries is the manufacture of manmade fiber and products. Very limited production of rayon filament and staple fiber began in 1957 and 1958, and total output reached 3,571 tons in 1960. By 1965, total fiber production had risen to 5,100 tons. Production (about 50 tons) of polyamide (Nylon) filament was started in 1964, and some polyester (Dacron) fiber capacity was added in 1965. By 1968, however Taiwan's total output of manmade fiber is expected to increase by 8 times to reach 50,000 tons, including rayon, polyamide, polyester, and polyacrylonitrile (Orlon) fiber.

The manmade yarn and fabric industries have progressed more rapidly. In 1960, only 5,850 tons of yarn and 6.8 million yards of fabrics were produced. By 1965, output had increased to 14,300 tons and 38.1 million yards, respectively. Further large increases are expected as more locally produced fiber becomes available.

Imports of both the fiber and the yarn and fabrics



**SERIOUS WOOLGATHERING:** the Chungho wool-top factory is the first of its kind established in Taiwan. It supplies the island's growing woolen textile industry.

have been sharply affected by the industry's dynamic expansion. The tremendous growth in yarn and fabric output, for example, has virtually eliminated once sizeable imports of those items. On the other hand, the same growth in yarn and fabric output has sharply increased the demand for imported fibers. Gradually, as local fiber production expands, the substantial imports of fiber will also begin to fall off. Imports of rayon, polyamide, polyester, polyacrylic, polyvinyl alcohol, polyvinyl chloride, polypropylene, and other staple fiber and filaments reached \$19 million in 1965, compared with only \$3.3 million in 1960. Japan is the chief supplier.

The next significant import wave will be for the raw materials needed to produce the various fibers—dissolving pulp in the case of rayon fiber, and caprolactum and dimethyl terephthalate (DMT) for polyamide and polyester fibers. Imports of dissolving pulp and the petrochemical intermediates have been increasing markedly since 1964. Eventually, as Taiwan's own petrochemical industry develops, and particularly as aromatic hydrocarbons become abundant, even the caprolactum and DMT will be able to be made locally.

Thus, the long run outlook is for little or no imports of yarn and fabrics, steadily declining imports of fiber, and very gradually reduced imports of



caprolactum and DMT. Only the dissolving pulp has a long term future. In the short run, however, at least until 1968, imports of both the fiber and petrochemical intermediates, as well as dissolving pulp, should expand. Since the United States is the principal supplier of caprolactum, DMT, and dissolving pulp, U.S. sales to the manmade fiber industry should do well for at least several years. Japan, as the leading supplier of fiber, yarn, and fabric, is likely to lose its markets first. Following is a more detailed analysis of the principal manmade fiber sectors.

Demand for rayon is fairly high in Taiwan because this material is a good substitute for cotton, and it can be blended with other fibers to make quality clothing material for the export market. Domestic fiber output, though begun relatively early, cannot yet meet the entire demand. In 1965, only 5.1 million pounds of 150 denier rayon filament and 6.2 million pounds of rayon staple fiber were produced, requiring imports of an additional 25 million pounds (\$5.3 million) in 1965, mostly from Japan. The Government hopes to attract foreign investment to set up additional rayon fiber plants. One U.S. firm is already planning a joint investment in a cellulose acetate plant. Another, Chemtex, Inc., has increased its investment share of Taiwan's leading rayon producing firm—the China Man-Made Fiber Corporation. Local production of polynosic fiber—an improved version of rayon—is also considered feasible. By 1968, output is expected to reach 7.9 million pounds of filament, 30.8 million pounds of staple fiber, 30.8 million pounds of polynosic fiber, and 2.6 million pounds of cellulose acetate. This will still leave a deficit of about 25 million pounds of rayon filament and 27 million pounds of rayon and other cellulose staple fibers in 1968 which will have to be made up with imports. As local production approaches self-sufficiency, import restrictions will probably be imposed and the import market shut off. At present, only the factories can import rayon fiber. The duty was reduced in 1965 from 80 percent to 40 percent.

Taiwan has an adequate domestic supply of caustic soda for rayon fiber manufacture. However, dissolving pulp, the other basic raw material, is not yet produced locally, mainly because suitable wood is not available in large enough quantities. Although one new rayon plant plans to set up a wood pulp mill to supply its own needs, most of the dissolving pulp for the rayon fiber industry is and will continue to be imported. About 12,000 tons arrived in 1965, all from the United States. By 1968, the demand should reach about 16,000 tons for both rayon and cellophane production. Only end users may import dissolving pulp. Duty is 10 percent.

Demand for polyamide fiber materials is also high because they are suitable for Taiwan's warm climate

and have good blending capacity for the export market. Until 1964, Taiwan's production of polyamide yarns depended entirely on imported multifilament and staple fiber. Local production of Nylon 6 filament began in 1964 (110,000 pounds), and several new filament and staple fiber plants are now being considered, it is hoped with foreign investment participation. Production capacity by 1968 may reach only about 13.8 million pounds of filament and 1.5 million pounds of fiber, still below the projected combined requirement of 17.4 million pounds. Hence, imports will be needed in large quantities for several more years. Roughly 15.9 million pounds worth \$8.2 million of Nylon 6 multifilament and staple fiber were imported in 1964, mainly from Japan. In addition, the United States has supplied very small quantities of Nylon 66. End users only may import the fibers. Duties were reduced in 1965 from 50 percent to 40 percent on the staple fiber and from 55 percent to 45 percent on the filaments.

The polyamide fiber plants now being established in Taiwan will all use imported caprolactum from the United States as the basic raw material. Demand for caprolactum is high, currently running over 7 million pounds a year. Imports should increase sharply, perhaps up to 19 million pounds by 1968.

The polyester fiber industry also has considerable potential. Since the fiber blends easily with cotton suitable for warm climates and wool for cooler climates, it has good export prospects in many countries. Thus, like the polyamide fiber, local polyester fiber production is also being started (110,000 pounds in 1964), with several plants in the construction stage. By 1968, polyester fiber capacity may reach about 7.5 million pounds of filament and 8.6 million pounds of staple fiber, considerably above the projected 1968 requirement of about 10 million pounds. Imports, which in 1964 reached 4.4 million pounds, worth \$2.3 million, will increase sharply over the next several years until local production catches up with the demand. Japan is the dominant supplier. Only the end users are eligible to import. The duties on polyester staple fiber and filament are 40 percent and 45 percent, respectively.

Taiwan's polyester staple fiber is made entirely from polymer resin, which is locally produced from imported dimethyl terephthalate (DMT) and ethylene glycol. DMT imports are now running over 2 million pounds and are increasing rapidly, with the United States the main supplier. However, the Government believes that production of DMT from local paraxylene will soon be feasible. Local production of ethylene glycol is not feasible, and this will still have to be imported.

As yet, Taiwan is producing no other manmade fibers. Under consideration for the near future, how-

ever, are plants to manufacture polyacrylonitrile staple fiber using locally produced propylene. Since the acrylic fiber is an inexpensive, low quality material which most people in Taiwan can afford, it has perhaps the greatest potential for local development. The fiber is now imported in large quantities from Japan—nearly 4 million pounds valued at \$2.1 million in 1964. The projected 1968 requirement of 14.3 million pounds will still exceed the 9.7 million pounds officials hope will be produced by 1968. Duty rates are the same as for polyamide and polyester fiber.

As indicated, Taiwan is already self-sufficient in the production of manmade yarn and fabrics for the local garment industry and for export. Total yarn imports in 1965, entirely from Japan, amounted to only about 65,000 pounds worth \$30,000 of rayon yarns; and 12,000 pounds worth \$17,000 of polyamide, polyester, acrylic, and other yarns. Imports are tightly restricted to protect the local industry, and duties are 50 percent on spun yarn, 55 percent on filament yarn, and 60 percent on thread. Fabric imports, although tightly restricted as well, totaled 443,000 pounds worth \$1 million in 1965, again mostly from Japan. The import duty on all manmade fabric is 80 percent.

Local production of manmade yarn and fabrics includes spun rayon yarn, stretch Nylon yarn, Orlon spun yarn, Nylon thread, Tetoron yarn, spun rayon flannel and gingham, Nylon fabrics and secondary goods. In addition, Taiwan is also producing blended yarn and fabrics for local consumption and for export. Products include polyester and wool yarn and fabrics, polyester and cotton fabrics, Nylon and cotton fabric, spun rayon and cotton blended yarn, rayon and cotton fabric, and silk and rayon fabric. In the case of cotton blends, the cotton content is kept below 50 percent in order to satisfy the multilateral agreements on cotton textile exports. Thus, blended fabrics have the greatest export potential of all Taiwan's textile manufactures. Considerable expansion of production can be expected, with corresponding increased demand for raw materials.

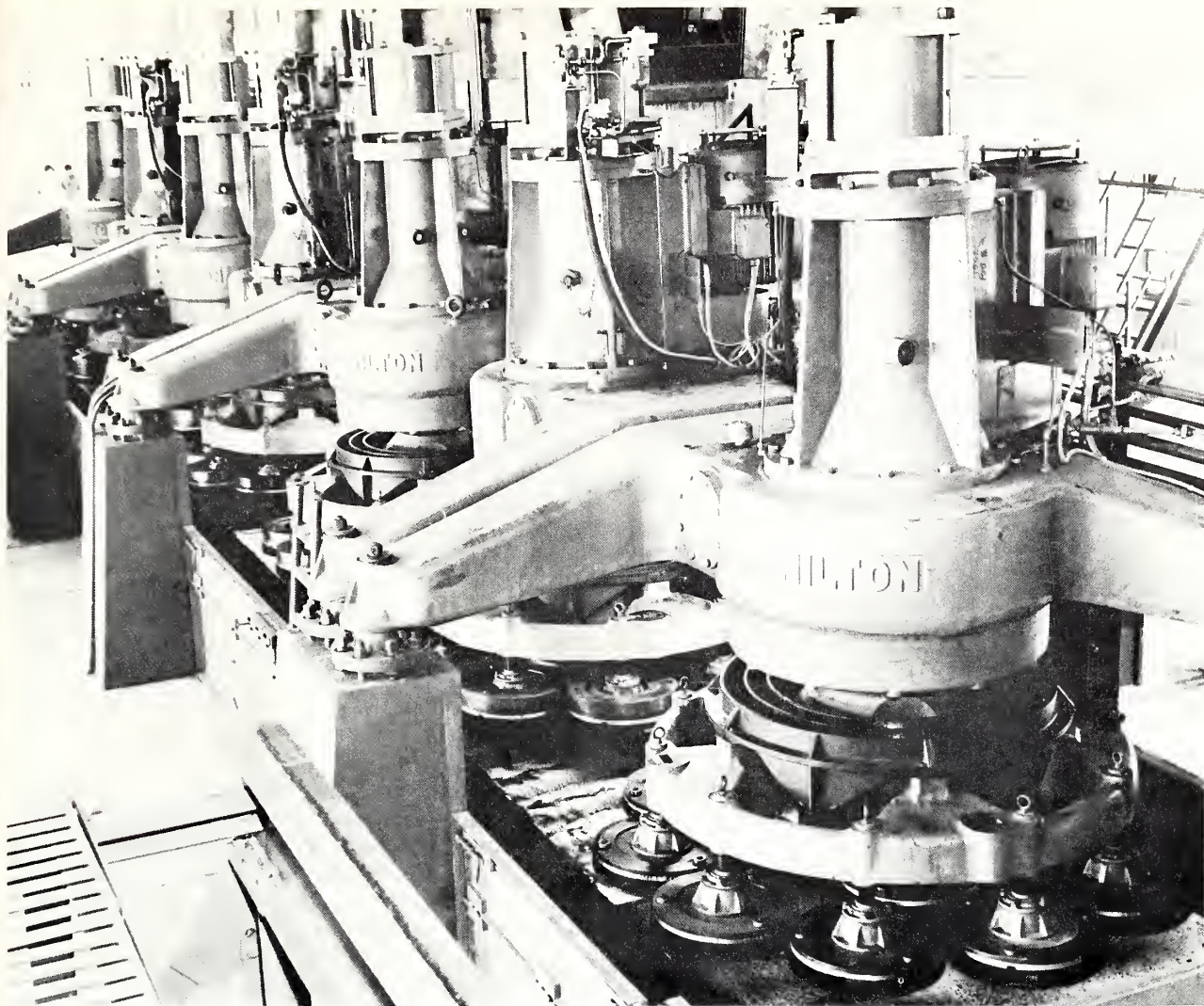
All the machinery for the manmade fiber industry is imported, with the United States the principal supplier. In 1965, there were approximately 126,000 spindles and 550 looms installed. Some spinners are expected to modernize their facilities to include polymerization as well as spinning. Almost all existing producers plan to expand their capacity. By 1968, at least 6 new companies will join the current 3 in producing rayon, polyamide, polyester and polyacrylic fiber. In addition, the Government is encouraging establishment of a manmade fiber industrial center at Towfen, where the largest rayon and nylon plants are now located. The plants to be built there would produce and export textiles processed from locally produced filament and staple fibers. The preliminary

plans call for construction of 4 or 5 brocade plants for daily output of 500-550 yards, 2 or 3 knitting plants for 15,300 yards of feather yarn a day, 1 printing and dyeing plant to process 1,800 to 2,000 yards of sheeting daily, 2 or 3 knitting plants to produce 4,400 to 4,500 pounds of gray sheeting a day, 1 plant to turn out 200 pounds of metallic yarn and 500 pounds of paper yarn daily, 1 or 2 stretch Nylon plants to produce 3,200 pounds of stretch Nylon yarn a day, 1 laminated fabrics plant to make 2,000 yards of material a day, 2 or 3 garment plants to produce 900 to 1,000 dozen shirts or other garments a day, 1 rug plant to produce 2,000 to 2,100 yards of rugs a day, 1 plant to make 5,000 square yards of fabrics that are not knitted, and 1 fully equipped research institute.

The printing, dyeing, and finishing industry has considerable need for improvement. Although present capacity appears large enough to meet Taiwan's needs for bleaching, dyeing, printing, and sanforizing cloth, the quality of output is not as high as it should be to enjoy better export markets. Much of the equipment is of local manufacture and obsolete. Replacement of machinery and installation of new testing instruments are essential. Sales opportunities for dyeing and finishing machinery should, therefore, be good. Taiwan also lacks technical knowledge of advanced dyeing and finishing methods. Licensing agreements in this field would be particularly welcome and could be tied in with the sale of machinery.

Synthetic organic dyestuffs are in great demand and are nearly all imported, with Japan, Switzerland, and Germany the main suppliers. Imports on the whole are increasing. In 1965 total imports amounted to \$3.2 million, compared with only \$1.2 million in 1960. The demand is highest for acid dyes, basic dyes, dispersed dyes, sulfur dyes, naphthol dyes, and vat dyes. Reactive and mordant dyes have limited demand. Taiwan, now can only produce sulfur black, but the Government is encouraging the development of the dyestuff industry, and over the long run imports may fall off. Except for sulfur black, imports are not restricted; the duty is 25 percent.

The garment industry has developed from practically nothing only 5 years ago to one of Taiwan's main export performers. Production of cotton garments began on a small scale in about 1960, followed in short order by wool, rayon, polyester, and blended fabric items. Value of production in 1960 was too small to be recorded. It grew to \$44 million by 1964 but declined the following year to \$28 million. During the same 1960-65 period, exports of wearing apparel increased from only \$2.8 million to \$18.3 million. At present, the garment industry produces mostly cotton, rayon, and cotton-rayon apparel, such as underwear, shirts, blouses, sweaters, socks, pajamas, children's



**THE FINAL TOUCH:** huge machines polish the glass products of the Hsinchu Glass Works, which makes sheet glass and rolled figure glass for export to the United States and several European countries.

wear, slacks and outerwear; Nylon hosiery and other Nylon garments; and increasingly, polyester and wool-worsted slacks and suits. It is expected that Taiwan will be increasing its exports of garments made of cotton and/or wool polyester blends.

Fabric and piece good requirements for the garment industry are almost all produced locally. However, there would appear to be good potential for sales of garment making machinery in Taiwan, particularly knitting and sewing machinery. Imports have increased sharply since 1960, from just about zero. By 1963, over \$1 million worth of sewing and knitting machinery was imported and in 1965 over \$2.6 million worth. Further expansion of the industry is almost a certainty. Japan has thus far supplied most of the sewing and knitting machinery, with Germany and the United States exporting some. There are no import restrictions; the import duty is 15 percent.

### *Glass*

Once a sizable import, flat glass is now produced locally in sufficient quantity for export as well as for the domestic market. Less than \$32,000 worth of glass was imported in 1965, mostly high grade sheet and plate glass, common window glass, and colored, stained, ribbed, embossed, and wired glass. Of these, only wired glass and silvered glass are not restricted. Duties on all flat glass items range from 40 to 60 percent. Other glass products namely bottles, fluorescent light tubes, ampoule tubes, glass lamp bulbs, and glassware are also locally available in sufficient supply.

Raw materials for glass manufacture including silicon sand, soda ash, dolomite, salt cake, charcoal, and limestone, are locally available and not importable. However, while there is virtually no market for imported glass raw materials and flat and other glass

products, there will be periodic opportunities for sales of machinery and equipment.

Only one company in Taiwan, the Hsinchu Glass Works, now makes flat glass. It has five plants largely equipped with U.S. machinery and produces annually 1,500,000 cases of sheet, frosted, figured, sculptured, and laminated safety glass. A new company, the Taiwan Glass Company, is constructing a plant which, under a Japanese license, will produce about 400,000 cases of sheet window glass and 200,000 cases of figure glass annually. The initial machinery requirements of over \$2 million will be supplied by Japan.

With the demand for flat glass constantly rising, the two major flat glass producers will be expanding productive facilities from time to time. This process will create continuing opportunities for sales of glass-making machinery i.e., drawing, cutting, annealing, bonding, frosting, grinding, washing, drying, rolling, cooling, beveling, and polishing machinery, and various kinds of glass testing equipment—screen testers, grain size counters, spectrophotometers, and density and viscosity testers.

In addition to flat glass expansions, other glass projects are being considered that will require imports of machinery and equipment. These include establishing a large-scale glass sand processing plant, a fiber-glass plant, and optical glass plant, and plants for glass blocks and other glass construction materials. Foreign investments and licensing agreements are particularly being sought to produce these products. Imports of glass making machinery and equipment are not restricted.

### **Cement**

Taiwan is the fourth largest cement exporter in the world, after Japan, Belgium, and France. It can supply all its own limestone, clay, sand, and pyrite cinder requirements and needs only to import gypsum, usually from Egypt, Mexico, and Cyprus. Although the industry is not yet producing at its full capacity of 3 million tons, further expansion of production facilities is already in process. Over the longer run, capacity will have to be expanded even further. Large quantities of cement are needed for commercial and residential construction and in national defense, communications, agriculture, forestry, water conservation and other industrial construction. Taiwan's cement export markets, though nearly saturated, will still increase to some extent each year. Production in 1965 amounted to 2.4 million tons. The 1968 target is 3.5 million. Thus, by 1968 new kilns will have to be built from time to time to keep up with the internal and foreign demand for Taiwan cement.

There are now 14 cement manufacturers in Taiwan producing portland and some white cement. The Tai-

wan Cement Corporation (TCC), the largest, operates 7 kilns in its plants at Kaohsiung, Chutung, and Hualien, and alone accounted for half the island's total production of cement in 1965. The Asia Cement Corporation and the Chia Hsin Cement Corporation, each with a 300,000-ton capacity, are the 2 other large producers.

Some cement machinery is made locally, but only for small cement plants. The major requirements therefore have to be imported. The original equipment in the largest plants was procured with U.S. AID funds and came from the United States, Germany and Japan. Recent equipment purchases have come principally from Germany and Japan on a package basis, with the rotary kiln, grinders, pelletizers, coolers, panels, motors, coal preparation equipment, packing equipment, and other parts all included. U.S. prices on package plants apparently have not been competitive. However, American coolers, mill motors, kiln drives, and pneumatic pumps seem to be preferred for their superior quality. Also, American parts are often used for replacement purposes. Approximately \$5 million worth of cement machinery was imported in 1965. There are no import restrictions on this type of equipment.

### **Base Metals**

Owing mainly to lack of mineral resources and insufficient capital and technology, Taiwan does not yet have an important metal producing industry. At present, only aluminum and some iron, steel, and copper products can be manufactured locally. However, the Government has clearly set forth as a main economic goal the further development of heavy industries, particularly the base metal and metal consuming industries. A proposed integrated steel mill is one reflection of this new trend, as are the plans to expand copper and aluminum producing capacity. Another expression of this emphasis was the creation in 1963 of a Metal Industries Development Center in Kaohsiung, financed with the \$1-million U.N. grant. The principal functions of the new Center are to assist local plants to improve their metal manufacturing processes, productivity, management practices, and marketing techniques. The Center is also equipped with workshop equipment and research and testing devices whereby to keep up with and train personnel in the latest technological developments in the metals industry.

These developments will afford increasing opportunities for the sale of raw materials and machinery and equipment. Metal imports, already very large, are increasing rapidly to meet growing industrial needs, particularly those of the machinery and appliance, vehicle assembly, metal fabrication, transport, communications, and construction sectors. Imports of base metals in 1965 were valued at about \$78 million,

compared with only \$32 million in 1960. Japan has been the principal supplier. Machinery imports, on the other hand, have only recently reached noteworthy levels. The island's limited production capability kept imports of metal working machinery under the \$1 million level until 1965. In that year, however, imports rose to \$2 million, supplied mainly by Japan, Germany and the United States; further increases are expected.

All of Taiwan's lead, zinc, nickel, tin, and brass requirements have to be imported, and come mostly from Japan, Australia, Malaysia, and Thailand. They are normally procured in unworked form for further processing into bars, rods, sheets, plates, and pipes. Imports reached \$5.8 million in 1965, more than triple the 1960 value. The United States supplies part of the zinc but little else. No significant expansion of rolling or extruding capacity is expected.

Some electrolytic copper is produced direct from copper concentrate by the Taiwan Metal Mining Corporation (TMMIC) and, to a lesser extent, by private companies using copper scrap. Total production is far below the domestic requirement, and substantial imports are necessary. Output of electrolytic copper in 1965 was only 1,900 tons, a slight increase over previous years. Another 1,500 tons of unworked copper valued at \$1.7 million was imported in 1965, along with 2,700 tons of copper bars, rods, sheets, plates, pipes, wire, strips, and foil valued at \$2.8 million. Japan is the major supplier of both worked and unworked copper. There are no restrictions on imports; the duty ranges from 15 percent on unworked to 20 percent on worked copper.

The Government is strongly encouraging increased local production of copper to replace imports. TMMIC plans a major step in that direction with its proposed construction of a \$5-million electrolytic copper plant, with an annual capacity of 6,000 tons. This would presumably make Taiwan self-sufficient in copper ingot. It could also lead to an expansion of processing capacity once a greater supply of ingot is produced. Much of the machinery for the new ingot plant will have to be imported. Thus, TMMIC may soon be in the market for blast and refining furnaces, electrolyzing equipment for smelting and refining, and pumps and compressors.

The aluminum industry is the most highly developed and successful of Taiwan's several metal industries. A low-cost power supply, booming local demand for aluminum products, and limited competition from higher priced steel products, all make the outlook for further growth excellent. The sole producer of base aluminum is the state-owned Taiwan Aluminum Corporation (TALCO), and its plants are operating at nearly full capacity to keep pace with local demand. Some 70 small-scale factories are also processing various aluminum products, including

wire, cable, door and window frames, zippers, tooth-paste tubes, and utensils. Export markets have yet to be fully exploited. Further expansions will clearly be necessary and are already being planned. The latest by TALCO, in 1965, involved purchases of \$4.6 million worth of machinery and equipment from Germany to expand rolling facilities.

TALCO can now produce 42,000 tons of alumina and 20,000 tons of ingot a year, using imported bauxite from Malaysia, petroleum coke and soft pitch from the United States, and caustic soda from local sources. It also has its own rolling, foil, and extruding mills turning out sheets; strips and circles; plain, paper-backed, printed, and embossed foil; and bars, rods, wire, nails, rivets, pipes, sections, and other finished aluminum products. The new expansion project will enable TALCO to begin production of bus and truck chassis, railroad rolling stock, fishing vessels, textile spindles, electrical plates, cables and wires, and parts for television sets, refrigerators, and washing machines. Under another expansion project, TALCO will spend \$5 million more to raise alumina and ingot production to 70,000 tons and 30,000 tons, respectively.

TALCO's overall output of aluminum and aluminum products is nearly sufficient for local needs. Only about 2,700 tons of aluminum, worth \$475,000 was imported in 1965, largely unworked aluminum alloys from the United States. However, most of the machinery required for TALCO's expansion projects, which are planned every 2 years on the average, must be imported. Since TALCO is a government enterprise, procurement of machinery is done on a competitive bid basis through open tenders issued by the Central Trust of China, Taiwan's state trading agency. Price is the decisive sales factor. U.S. machinery is already well represented in TALCO's plants, as is Japanese, German, and local equipment. For example, in the reduction plant, the electric arc furnaces and tapping ladles are American, the digesters are Japanese, and the pots are local; in the casting shop, the continuous casting mold and oil-fired furnaces are local, the slab cutting machines German, and the scalping machines Japanese; in the rolling and foil mills, the roll grinding, rough and fine rolling, and embossing machines are U.S., the shearing machines and cold mills for sheet foil (2, 3, and 4 high) are Japanese; the slitter and color printing machines German; and the hot rollers, slab heating furnace, and paperbacking laminating machines local; in the extrusion mills, all the presses and stretchers are U.S. In addition the laboratory equipment is mostly Japanese, and the machine shop mostly German.

Taiwan's iron foundry industry is not well structured or particularly efficient, but the demand for its castings is increasing and some improvement and expansion will have to take place to raise production

and meet the quality standards needed. There are now about 118 foundries on the island producing sufficient gray iron castings but not enough high strength and malleable iron castings. Output consists primarily of cast iron pipes and fittings, vehicle parts, ingot molds, iron parts, and parts for industrial machinery. No separate data are available to show imports of castings; the figures are included in overall import statistics for machinery parts.

By 1970, the demand for iron castings is expected to reach 60,000 tons, or 50 percent above 1965 production. In particular, the demand for better quality irons and better quality castings should increase. Thus, the foundry industry has potential for growth. Although this growth will not likely require appreciably increased raw material imports, it could lead to greater imports of foundry machinery. Present equipment is not at all adequate for quality production.

Virgin pig iron, the main raw material for iron castings, is produced locally from one small blast furnace and several small electric furnaces. None is imported, although the unit price of Taiwan pig is from \$15 to \$42 a ton higher than equivalent U.S. grades. Other locally available raw materials include low grade pig (made from foundry-shop returns and machine shop chips and turnings), scrap iron (consisting of machine shop turnings and discarded consumer and capital goods), coke, limestone fluxes, acid-type furnace linings (either firebrick or silica blocks), and molding and core sands. Scrap iron, mainly in the form of engine blocks from the United States, is also imported, but under carefully controlled conditions to guard against their conversion into usable engine blocks. The import duty is 10 percent.

Most of the foundries are small scale, inefficient, and inadequately equipped. The quality of castings produced is generally poor, and improved techniques and machinery are clearly needed, particularly in terms of cupola design, sand preparation handling facilities, and cleaning and fettling equipment. Molding practices also require improvement, notably in the use of prepared sands for molding and core making to obtain higher quality castings.

The majority of installed melting units are either of the small or conventional cupola types, with metal temperatures generally in the range of 1380-1430°C. Only a few of the plants have hot blast cupolas for producing at higher metal temperatures (1480-1530°C). The few Girod arc furnaces in use are outdated and cannot control chemical composition accurately. Only 3 foundries have molding machines. The demand for particular castings is too limited for economical machine molding. For large molds, a few shops employ pneumatic rammers; sand slingers are not used.

Sand preparation is done mostly by hand, although

some of the larger shops have sand mullers for mixing purposes. Green sand molding is the process used in nearly all the shops, even though it is obsolete and results in defects in the castings. Pit and floor molding is widely used for larger casting, while centrifugal casting is used to make cast iron pipes. Core making is done almost entirely by hand. The pouring equipment employed for transferring hot metal from cupola to mold is primitive. Only a few foundries have shot-blast equipment or tumblers for cleaning the castings, which is largely done by hand with wire brushes. Often, too, the castings are delivered as cast, with only the runners and fins removed.

Import values for foundry equipment are not available. Most of the equipment in use was locally made. The hot blast cupolas were bought from Germany and Belgium. Taiwan probably cannot manufacture the better equipment needed to modernize its foundry industry, so that any significant improvement in this industry would be dependent on imports of machinery.

The steel industry has made little progress in recent years. Lacking iron ore resources and having no significant iron producing capability, Taiwan's steel has been refined mainly from imported scrap in electric arc furnaces and rolled in 40-50 small, poorly equipped mills. Production costs are relatively high. Only round-rolled steels can be made locally. Virtually the entire requirement for flat-rolled steels, as well as most shapes, heavy rails, seamless and special pipes and fittings, and silicon and tool steels, must be imported in finished and semifinished form.

The industry is just recovering from a financial crisis, brought on by high costs, excess capacity in round-rolled steels, obsolete equipment, mismanagement, and overextended borrowing. Thanks to fortuitous large purchases from Viet-Nam and timely government action, excess production is being siphoned off and the most critical financial difficulties are being overcome. The main problem of high cost production will remain, however, unless the scrap-reliant electric arc furnaces and the antiquated rolling equipment are modernized. Nevertheless, the future of the steel rolling industry is much brighter than could have been imagined only a few years ago.

One development offering great promise to existing mills is the proposed \$35-million investment by the Esso Standard Eastern Co. of the United States to build a 1-million-ton sponge iron plant, using imported iron ore from Malaysia.

The most dramatic prospect is the proposal now under consideration for an 800,000-1 million ton integrated steel mill costing some \$200 million. If it is built, such a mill would triple Taiwan's 1965 steel output of about 310,000 tons. An American consulting and engineering team submitted its report on the feasibility of the proposed mill in November 1966.

Of the 50 or more steel plants now operating, only 2 are equipped with iron and steel smelting and steel rolling facilities. Most of them simply refine scrap into steel ingot and process the ingot into a few round rolled products—mainly round bars, wire rods, small angles, light rails, rivets, nails, and screws. Small quantities of flat products are also produced, for example black and galvanized sheets and tin plate, but in each case the base plates or sheet bars must be imported. They are rolled and later galvanized or coated with tin. Steel plate is not produced; it must be entirely imported. Some steel pipe can be made locally from imported strips by the welding process.

Scrap refining is done almost exclusively in electric arc furnaces having high rates of power consumption and limited ingot output. The largest furnace now installed has a 10-ton-a-day capacity. All the rolling mills are small and poorly equipped, with a maximum 4" size billet-rolling capacity. Only one steel plant has integrated facilities for producing steel direct from iron ore by electric smelters and oxygen converters, but its capacity is only about 30,000 tons a year.

Pig iron is not used for steel melting because the electric arc furnaces in nearly all the plants take 100 percent scrap charges. With no great demand for pig iron in the steel industry, few pig producing facilities have been established. Total output in 1965 was only 72,000 tons, just sufficient for the needs of the iron foundry industry. Thus, there is no substantial iron producing facility in Taiwan to form a foundation for the steel industry, hence demand for steel scrap should increase at least for the next several years. About 440,000 tons of iron and steel scrap worth \$22 million were imported in 1965, mostly from the United States. Even if an integrated mill is built, the existing, scrap using plants will be expanding their production and will need more scrap. The proposed sponge iron plant may replace some of the scrap import, but current plans call for most of the sponge iron to be exported rather than to be used locally. The import duty on iron and steel scrap was increased from 5 percent to 10 percent in 1965, and only end users are eligible to import it.

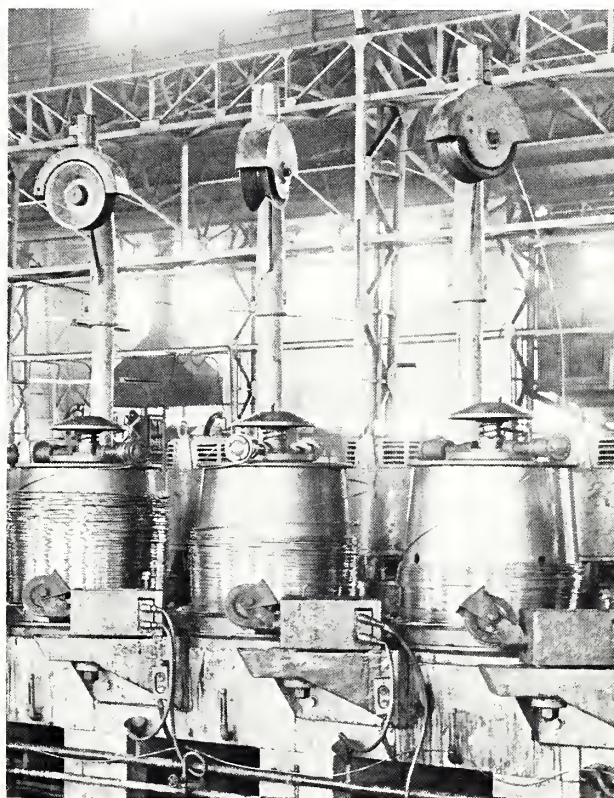
Basic iron and steel imports are high. In 1965, about 300,000 tons valued at \$44.3 million were imported, mainly flat rolled steels from Japan. Presumably, the flat rolled steels made in the integrated mill would eventually replace part of the present import requirement. However, since the project is still uncertain at this stage and, in any case, would not become operational for some time even if established, the steel import market for at least the next several years should expand.

Taiwan's steel industry needs improved machinery. Production is carried on for the most part in small, very inefficient units. Fixed assets per plant, for example, average only about \$134,000, while the average

horsepower in use per plant is 583. Nearly all the smaller plants have obsolete equipment, some manufactured locally and some recovered from pre-1945 Japanese plants left on the island. The electric steel refining furnaces in these plants are all of too small capacity. Even the few large plants are operating a good deal of obsolete equipment.

Little can be done for the smaller plants in terms of modernization or expansion. Such efforts would be extremely costly and probably not worthwhile. In the case of the larger plants, however, if they are to produce steel at competitive prices, they will have to replace some of their facilities. And if they are to expand and diversify, as they must to survive, they will be needing much new equipment. The most likely fields for expansion are steel bars and rods, angles, steel pipes, galvanized wire, nails, and iron and steel castings. Promising areas for diversification in existing mills, for which additional machinery will also be needed are billets, sheet bars, medium rails, 6" angles, 10" channels, 6-12" I beams, tin plate, and black and galvanized sheet. In addition, the proposed integrated mill would need new machinery for producing pig iron, steel ingot, heavy and thin plates, pipe skelps, black sheets, galvanized sheets, and tin plate.

**ECONOMY-SIZED SPOOLS:** they hold the output of the China Electric Wire & Cable Company. Imports of wire-making machinery jumped more than 600% in value between 1960 and 1965.



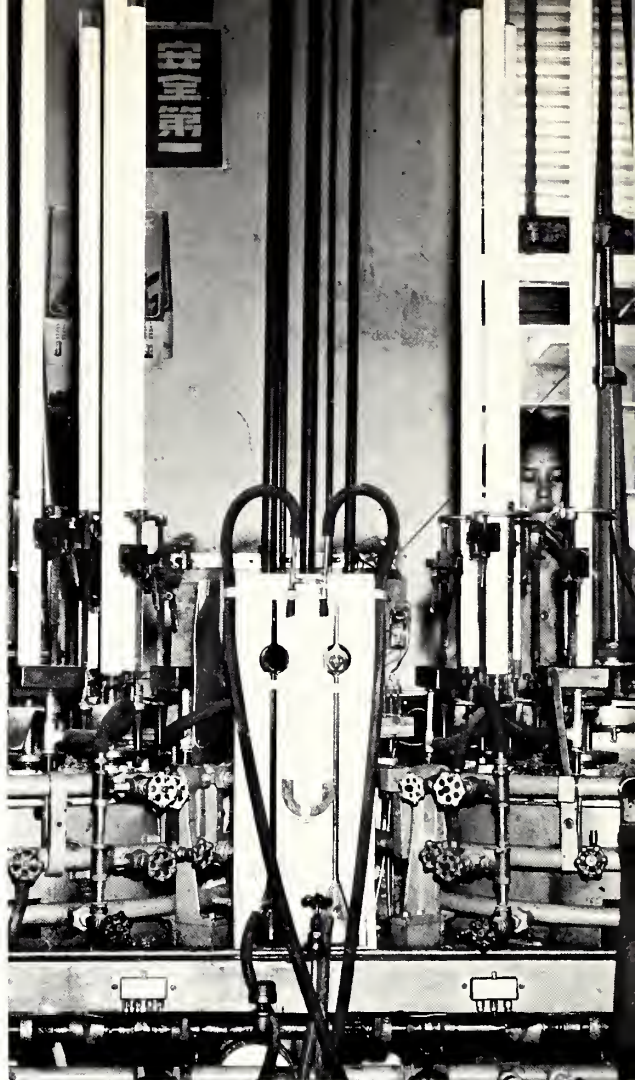
Imports of steel manufacturing and wire making machinery (excluding machine tools) amounted to nearly \$1 million in 1965 compared with \$150,000 in 1960. The most active future import demands should be for larger electric smelting furnaces, continuous heating furnaces, graphite electrodes and electrode paste equipment, oxygen converters, cranes, wire and nail making machinery, pipe and tube casting machinery, sheet rolling machinery, and equipment for a 24-28" rail and structural mill, cold reversing mills, and plate mills. There are no restrictions on machinery imports; the duty is 10 percent.

### *Machinery and Appliances*

Perhaps no industry in Taiwan has progressed more rapidly or appears to have a brighter future than the machinery and appliance industry. In just the 5 years from 1960 to 1965, production value of machinery and appliances rose fivefold, from \$17 million to \$86 million. Yet, this rising output has hardly kept pace with the rapid growth in demand for machinery and equipment. The rate at which domestic production is beginning to replace the large import requirement is even slower. Thus, machinery imports have expanded from about \$36 million in 1960 to about \$89 million in 1965, and the prospect of an even faster rate of import increase appears likely.

Taiwan has rather limited ability to produce general industrial machinery. The only machines made with some degree of acceptance are small diesel and gasoline engines, power tillers, textile machinery other than automatic looms, sewing machinery, edible oil extraction equipment, sugar manufacturing and brewery equipment, dairy and grain milling machinery, tobacco and rubber processing machinery, printing presses, bookbinding machinery, small industrial steam boilers, small compressors, standard centrifugal pumps, simple machine tools and a variety of hand tools for woodworking, plumbing and machine shop use. Although output of these machines is rising and to some extent replacing imports, many years will elapse before Taiwan can offer adequate substitutes for the machinery and parts that now must be imported. Thus, the long run outlook is for expanding machinery imports.

Still imported in large and increasing amounts are high-voltage power generating equipment and parts, internal combustion engines, textile machinery, industrial sewing and knitting machinery, pulp and paper-making machinery, lumber and woodworking machinery, glass and cement making machinery, chemical manufacturing equipment, metal working machinery, pumps and pumping machinery, oil refining equipment, and excavation machinery. Also imported increasingly, but on a smaller scale, are food processing machinery, packaging machinery, air-conditioning and refrigeration equipment, plastics fabrication machin-



**FLUORESCENT FOREST:** products of the Taiwan Fluorescent Lamp Company are enjoying brisk sales throughout the entire Southeast Asia area.

ery, printing and bookbinding machinery, oil drilling equipment, compressors, quality control and testing instruments, and parts for low voltage power generating machinery. (The market for specific industrial machinery is discussed in detail in the relevant industry analyses.)

There are now about 700 factories in Taiwan making various kinds of electric appliances and apparatus. Relatively few of these, however, are important producers. The main emphasis has been on light consumer electric appliances—fans, refrigerators, air conditioners, washing machines, freezers, mixers and blenders, toasters, incandescent and fluorescent bulbs and lamps, watt-hour meters, and telephones. Production has increased from practically nothing in 1960 to export capability levels in 1965. New product lines are added each year to the overall mix, and considerable plant expansions are taking place all the time, often as a result of licensing agreements with Japanese and some U.S. firms.



Imports of consumer appliances in finished form are generally restricted, both to protect the local industry and to avoid spending foreign exchange on unessential luxuries. Nevertheless, imports have increased from about \$500,000 worth in 1960 to over \$1 million in 1965. If the restrictions are ever liberalized, as may eventually happen if present economic trends continue, the demand for imported consumer appliances could well expand sharply (the market for these products is discussed further on pp. 56 and 91).

Production of electrical apparatus, specifically induction motors, transformers, power capacitors, storage batteries, and dry cells, is often undertaken by the appliance producers as well as a number of small, specialized firms. To an increasing extent, local production of these items is reducing the former dependence on imports. Transformers are the main item still imported in significant amounts, although their import value has declined from about \$1.6 million in 1960 to under \$1 million (290,000 kva) in 1965. Further plant expansions should increase transformer production to 380,000 kva by 1968, and reduce the import requirement to about 200,000 kva. Local output of transformers under 50 kva capacity is already adequate. Imports of motors, batteries, dry cells, and capacitors fell by more than half from \$1.2 million in 1960 to only about \$500,000 in 1965. Motors under 1 hp. are now produced locally in sufficient amount. Although the demand for motors is expected to rise sharply from about 220,000 hp. in 1965 to 296,000 hp. in 1968, increased local production will gradually reduce the import requirement from the 23,000 hp. in 1965 to only 16,000 hp. by 1968. Capacitors below 50 MFD are sufficiently produced, and imports are restricted. Secondary batteries and cells and B dry cells were still importable in 1965, but a new U.S.-owned battery plant near Taipei will probably make Taiwan self-sufficient in batteries in the very near future. Import duties on motors, transformers, and capacitors range from 15 to 35 percent, while the duty on batteries and dry cells is 35 percent. Japan has been the principal supplier of most electrical apparatus.

The spectacular growth of electric appliance and apparatus output has resulted in sharply increased local demand for electrical materials and components. Some can be made locally, such as low-voltage insulators, switches and sockets, permanent magnets, copper and magnet wire, and insulated wire and cable. However, Taiwan is a long way from self-sufficiency in these materials, and considerable imports, which increased from about \$3 million to \$6.4 million in 1960-65, are still required.

The principal imported items are parts for refrigerators and air conditioners (compressers, evaporators, and condensers), parts for watt-hour meters and transformers, electric cords, bare copper and insulated

wire, insulating materials, and plugs, sockets, insulators, and fuse switches. Of these, only insulated wire and cable show a declining import trend as a result of increased local output. They fell from \$1.7 million in 1960 to \$1.4 million in 1965, with Japan the main loser. Refrigerator parts imports increased from nil in 1960 to over \$1.9 million in 1965, mostly from Japan and the United States. The latter may begin leveling off, but imports of air-conditioner parts should increase rapidly. U.S. suppliers should therefore find excellent opportunities in the air conditioner field, particularly through licensing agreements and joint ventures for local assembly. In fact, Japanese licensors or partners usually require in their agreements that the raw materials be purchased from or through them. This technique offers the best promise of penetrating the import barriers against finished consumer appliances. The Chinese Government is also very receptive to this approach, since it brings in foreign capital and technology and helps to develop local export industries. Duties on imported materials and components are generally in the 20-25 percent range, but may be exempted altogether if the processed appliance is exported from Taiwan.

Several United States and Japanese firms have already concluded investments or licensing agreements with local manufacturers in the consumer appliance field (a full list of such United States firms is given in Appendix D). A case in point is the Tatung Engineering Corporation, Taiwan's leading domestic manufacturer. Capitalized at \$2.5 million and operating 14 plants, Tatung has licensing agreements with Whirlpool Corporation of America, International General Electric Co., Westinghouse International, and several Japanese firms. The company produces the entire range of consumer appliances now available in Taiwan and adds, on the average, one new appliance a year to its production line. It also produces motors (1/10 to 1,000 hp.), transformers (37.5 KVA round core and 500 KVA distribution types) and power capacitors (260 KMFD). Future expansion plans will also include permanent magnets, refrigerators, air conditioners, and tool making equipment.

Rapid development of machinery and appliance manufacturing is reflected in the growth of imports of machine tools and specialized equipment used in the industry. Machine tools are, of course, the basic requirement in machinery manufacture. Taiwan can make some of its own drill presses, planers, shapers, simple lathes, power and friction presses, filing and dye making machines, and machine shop tools. But the more sophisticated and precision tools and a large number of machine shop tools must be imported, namely heavy lathes and shapers; milling, grinding, boring, broaching, polishing, slicing, dye making and contour machines; pneumatic and electrically operated portable tools, twist and other drills, files,



**GROWING ELECTRONICS INDUSTRY:** this electronic components plant is owned by a wholly-owned subsidiary of the General Instrument Corp. of the United States.

wrenches and wrench sets, pliers, tool sets and kits, screw drivers, taps and dies, tips, hack saw blades, band saws, circular saws and augers and bits, planes and blades, hammers, chisels, cutting tools, reamers, and diamond tools. Total imports of machine tools increased from \$665,000 in 1960 to \$1.7 million in 1965, while machine shop and hand tool imports rose from \$1.6 to \$3.4 million. Japan and the United States are the main suppliers of machinery and tools, although German and some Swiss and British machine tools are gaining acceptance. Imports are not restricted; the duties range from 7½ to 10 percent.

Instruments for testing electrical properties are also widely used in the industry. No data are available on the amounts imported. However, since little or no electrical testing equipment can be made locally, the entire requirement is probably imported.

### **Electronics**

The electronics industry is Taiwan's newest. As late as 1960, there were no factories producing electronic products of any kind except for a few small plants assembling tube radios for the local market. All the components were imported. By 1965, more than 30 modern factories were producing 100,000 tube radios,

600,000 transistor radios, 30,000 TV sets, and some electronic components.

The potential for further rapid development is excellent. The manual dexterity and low cost of Taiwan labor, combined with Government encouragement of the industry and the promise of rich local and export markets, are particularly conducive factors. Several major foreign producers are already setting up their own plants in Taiwan or are working out licensing agreements with local firms. Japanese producers, in particular, have used the joint venture and licensing approach as a means of cornering the market for their electronic components. For example, with an aggregate equity investment of only about \$1 million and several other licensing agreements with local producers, a few Japanese firms have acquired virtual control over the supply of TV and transistor radio components.

The United States approach has inclined more toward setting up wholly-owned Taiwan subsidiaries to produce low cost components and complete units for shipment back to the United States. General Instruments Corporation, the first United States firm to invest, set up its plant in 1964 to produce transistor radio and TV components for the United States market. The largest United States investment in the

field, and easily the most important electronics undertaking by any foreign firm in Taiwan will be made by the Philco Corporation. Its investment in a wholly-owned plant may eventually total \$24 million over the next 5 years. The plant will turn out subassemblies and complete TV sets and radios.

These American firms generally have equipped their plants with the most advanced United States-made equipment, especially quality control and testing apparatus, as good as they use in their plants at home. On the other hand, they do to a considerable extent draw on the open market for supplies and components, procuring part of their requirements from Japanese sources, for example, when the quality and price of such items are found to be competitive.

With all but a very minor sector of Taiwan's electronics industry in the hands of Japanese and American producers, who generally pattern their procurement policies along the same lines as they follow at home, there presently appear to be few opportunities in Taiwan for nonaffiliated United States exporters of apparatus, supplies, and components.

As local production of components expands and improves in quality, the demand for raw materials used in their manufacture will also increase. Taiwan cannot yet supply such quality materials as fine aluminum foil, insulating tissue paper, mica sheet, silicon steel sheet, magnet steel, bakelite sheet, carbon elements, tube elements, silk and enameled covered wire, and high impact polystyrene.

With the emphasis on producing for export and the clear need for raising quality to meet international standards, increasing use of electronic testing instrumentation will also be required. Almost none can be made locally. Oscilloscopes, oscillators, signal generators, genescopes, current testers, and related instruments must be imported. Japan has been the principal supplier, partly because of lower prices but also because local firms are not familiar with American equipment. Opportunities for United States sales in this field are believed to be very good if the price is right.

### ***Electric Power***

Taiwan's electric power generating capacity is one of the highest in Asia. Per capita output of 580 kw.-hr. in 1965 was exceeded only by output of Japan and Israel. Yet industrial power is still occasionally interrupted, and substantial new capacity will be needed to permit industries to operate in the future without power stoppages. Capacity at the end of 1965 was 1,186,200 kw. Under a 10-year program begun in 1965 capacity is to be increased to 1,943,790 kw. by 1968 and 3,037,790 kw. by 1974.

United States and Japanese power generating machinery dominates the present system. In fact, the electric power industry has probably consumed more

American machinery than any other industry on the island. From 1960 to 1965, Taiwan imported a total of \$170 million worth of U.S. machinery of all kinds, of which power generating, transmission, and conversion machinery alone accounted for over \$29 million, or 17 percent. However, \$20.7 million, or about 72 percent of this United States-supplied power machinery was financed with United States aid. With the AID program phased out, power machinery is likely to be purchased increasingly with institutional financing (World Bank, Export-Import Banks) and under long-term supplier credits. The general payment terms in these latter arrangements have been 10 percent down on signing of the contract, 10 percent on delivery, and the balance due over a 10-year period at 5.8 percent interest a year. The competition for this market, particularly from Japanese suppliers will become very much keener.

The Government-owned Taiwan Power Corporation (TPC), the island's sole electric utility company, is the main user of imported equipment. While individual factories are encouraged to install their own power generating units, very few have or are likely to because of their high cost and the relatively cheap power available from TPC. Thus, no generating plants other than TPC's have a capacity above 10,000 kw.

TPC now has an integrated, balanced system consisting of 35 generating stations, of which 26 are hydro plants having an installed capacity of 628,500 kw., and 9 are thermal having an installed capacity of 558,000 kw. Of the hydro stations, 4 are storage plants, 5 are pondage plants, and 17 are run-of-river-plants.

The demand for electricity has increased sharply in recent years, owing mainly to rapid industrialization, a massive rural electrification program, and rising incomes resulting in greater use of electric appliances. For example, consumption of power by industry and residential and commercial consumers has increased by an average of 13.6 percent a year since 1960. TPC has barely managed to keep pace with demand, even with continuous expansion projects. Total system energy output rose by 13 percent a year during the same period and reached a record 6,455 million kw.-hr. in 1965. About 80 percent of this was sold to industrial consumers and 20 per cent to residences and businesses for lighting purposes.

Officials expect the demand for overall electric power to increase by a somewhat lesser rate over the next 10 years—9 percent a year on the average (10.5 percent a year for residential and commercial lighting and 8.6 percent for industrial use). On this basis, demand will reach 12,292 million kw.-hr. by 1974, more than double the present output. To meet the demand TPC estimates the necessary annual plant expansion at 93 mw. of firm power and 140 mw. of dependable peaking power plus a suitable system re-



**EXPANDING TO MEET DEMAND:** the generating capacity of the Shenao Thermal power plant was doubled to reach 250,000 kw. in a major development project completed during 1966.

serve. Thus, TPC has programmed a 10-year, \$352 million expansion plan to raise installed capacity from 1,186,196 kw. to 3,037,800 kw. by 1974, of which 1,270 mw. will be hydro, 1,647 mw. thermal and 121 mw. reserve. Of the total cost, roughly \$213 million will be for imported equipment and materials. These will mainly include turbines, generators and accessories, boilers, cooling systems, automatic control instrumentation, power transformers, circuit breakers and other switch gear, ash handling equipment, piping and insulation, excavation and tunneling equip-

ment, and miscellaneous construction materials, such as structural steel shapes, drilling rods and bits and concrete additives. Blasting materials, reinforcing bars, and cement are locally available. Import duties on the generating equipment are 15 percent for high-voltage machinery and 25 percent for low-voltage equipment.

Construction has already been completed or begun on some of the new generating projects. These include the new Tunghsiao gas turbine project (four 14,000-kw. package type gas-fired units), completed in 1965;

extension of the Kukuan hydro project (2 new 45,000-kw. units), completed in 1966; extension of the Shenao thermal project (a new 200-mw. turbo generator, 1800-psig, 1000°F/1000°F reheat, hydrogen-cooled unit), completed in 1966; the new Linkou thermal project (300-mw. turbo generator, 2,400-psig, 1000°F/1000°F reheat, hydrogen-cooled unit), due for completion in 1968; and the new Lower Tachien hydro project (45-meter-high concrete gravity dam, 3.3-mile-long and 22-ft.-diameter pressure tunnel, two 820-ft.-long penstocks, and an underground power station to house four 90-mw. generators), due to be completed in 1969. The remaining plants to be built after 1969 will include two 300-mw. oil-fired thermal plants at Talin (the U.S. Export-Import Bank will lend TPC \$31 million to finance the import of United States equipment for this project, scheduled for completion in 1969-70); the 94-mw. Tachien Dam project; a 300-mw. nuclear plant in the north; and possibly the 100-mw. Tsengwan reservoir project in South Taiwan.

With the increase in generating capacity, TPC will also have to expand its transmission and distribution facilities. The power system is now served by a primary transmission trunk line of 154-kv. running the length of the island along the western coast, a 66-kv. and several 33-kv. lines along the eastern coast, and a 66-kv. tie line interconnecting the east and west generating systems. Transmission lines reached a total circuit length of over 2,800 miles in 1965. Twelve primary (high voltage) substations along the primary line are stepping down the 154-kv. voltage to 66 or 33-kv. to supply 153 secondary (low voltage) substations at the load centers. Total installed transformation capacity of the primary substations was 1,038,300-kva. in 1965, while the secondary substations had a total capacity of 1,002,300-kva.

Primary distribution feeder lines coming out from the secondary substations are operated at 3.3, 5.7, or 11.4-kv. TPC is about halfway through its program to convert the old 3.3-kv. primary distribution voltage to 5.7 or 11.4-kv. Secondary distribution lines to end consumers were originally 100-v. single-phase and 200-v. 3-phase. These were all converted in 1962 to 100-v. single-phase for lighting and 220-v. 3-phase for industrial power in order to meet international standards. Total circuit length of distribution lines in 1965 was 23,000 miles.

The transmission lines are generally mounted on galvanized steel towers, while reinforced concrete poles are used for most distribution applications. The latter are locally spun, but fabricated galvanized steel must be imported. The original 154-kv. lines were conductored with 300 mcm hard-drawn copper. All further expansions, however, will use all-aluminum steel-reinforced (ACSR) conductors. All-aluminum conductors are also being installed in some distribution and subtransmission lines. ACSR wire is imported,

while aluminum wire is locally produced. The original 154-kv. lines carried galvanized steel over-head ground wires. These are being replaced in specific high corrosion areas with copper-weld conductors, and elsewhere with high-strength specially galvanized steel.

Over the ten-year period 1965-74, TPC plans to spend an estimated \$218 million on new transmission and distribution projects to coordinate with the proposed additions to generating capacity. About \$46.6 million of this amount will be for equipment imports, mainly high-voltage conductors, high- and low-voltage transformers and capacitors, switch gear, and circuit breakers. Specific projects to be undertaken during the 1965-68 period will include:

*For the transmission system:*

Construction of 150 miles of new 154-kv. steel tower transmission lines.

Installation of a 13-mile 154-kv. circuit on an existing tower line.

Reconditioning of 62 miles of existing 154-kv. transmission lines.

Construction of 4 new primary substations with a combined transformation capacity of 300-mva.

Expansion of 8 existing primary stations totaling 473.5 mva.

Addition of 20 new 54-kv. transmission line terminals and replacement of 9 existing 154-kv. breakers at primary substations and power plants.

Addition of 20-mvar. switched capacitor banks in primary substations.

*For the new subtransmission system:*

Construction of 7 new distribution substations with a total capacity of 96 mva.

Extension and/or reinforcement of 66 distribution substations, totaling 425 mva.

Erection and/or reconstruction of subtransmission lines, 69/34.5 mv, totaling 240 miles.

*For the distribution system:*

Installation of additional distribution transformers, 118.1 mva.

Installation of 68 mvar of additional distribution capacitors.

Improvement of distribution system in the Kaohsiung and Taipei areas.

Distribution voltage changeover, 119 miles.

Installation of 400,000 additional kw.-hr. meters.

## **MARKET FOR GENERAL INDUSTRIAL EQUIPMENT AND MATERIALS**

### ***Pumps and Pumping Equipment***

The market for pumps and pumping equipment is fairly large and active. Total imports reached \$1.4 million in 1965, compared with \$800,000 in 1960. Best prospects are for the more sophisticated types, such as submersible pumps, centrifugal pumps, and vertical line shaft deep-well pumps. The expanding

petroleum and power industries are particularly heavy consumers. Submersible pumps are in demand because of easy installation and adjustment to reach a gradually dropping water level in the deep wells located throughout the island of Taiwan. Local production, confined to simple water pumps, is done by about 38 small producers.

United States-made pumps and pumping equipment sell very well. Pump imports from the United States increased from \$520,000 in 1960, to \$1 million in 1965, when they accounted for 76 percent of the market. Japan and West Germany trail well behind as suppliers. Imports of most pumps are not restricted and the duty is 12½ percent.

### ***Industrial Air-Conditioning and Refrigerating Equipment***

The market for industrial air-conditioning and refrigerating equipment is potentially excellent. Taiwan's hot and humid climate, the rise in construction of large buildings, and the growth in industries that require climate control, for example textiles and frozen foods, all suggest further growth in demand. Most equipment of this type must be imported. There is only one known local producer making large size package units of air conditioning for factories and large buildings. Several other firms import and assemble parts and make only the duct work locally.

In 1965, imports were valued at \$1 million, with the United States supplying nearly all the air-conditioning equipment and Japan, Denmark, and the United States sharing the industrial refrigeration market. Imports are controlled and may be procured only by end users. The import duty is 12½ percent.

### ***Internal Combustion Engines***

The market for internal combustion engines is large and growing. Total imports nearly doubled from \$4.4 million in 1960 to \$7.4 million in 1965. The United States share of the market, however, has been declining, due mainly to increased competition from Japan. Imports from the United States in 1965 were valued at \$1.5 million, or 20 percent of the market, compared with \$5.6 million, 75 percent from Japan.

Taiwan's biggest demand is for diesel marine engines in the 500-hp. and under range. United States sales have mostly been in the 200-hp. to 500-hp. range, while Japan has concentrated on 300-hp. and below. The main purchasers of diesel marine engines are the Keelung and Kaohsiung Harbor Bureau, government fishing cooperatives, and the Chinese Navy.

U. S. marine diesel engines, though fully competitive pricewise, have not sold as well as the Japanese engines mainly because Taiwanese fishermen and mechanics are more familiar with the Japanese engines, and spare parts can be obtained faster from

Japan. American manufacturers might consider setting up a regional sales and service organization to serve Japan, Korea, Okinawa, and the Philippines, as well as Taiwan, so as to provide promotional assistance, mechanical training, after-sale service, and spare parts more quickly and cheaply.

Although the market is greater at this time for marine than other diesel engines, United States suppliers have been more active and successful in the sale of diesel engines for industrial use and power generation. The key to increased sales in this field is to establish close relations with plant engineers who write the specifications for new orders, since most imports of engines for industrial use are procured under a competitive bid basis through the Central Trust of China.

The market for gasoline engines in Taiwan is less significant. The only American engines in this category that sell well are in the 10-hp. and under range. They are used mostly on the farms for water pumps and small threshing machines.

Imports of internal combustion engines of over 10 hp. for the generation of electricity and parts thereof are not restricted and the duty is 15 percent. Engines under 10 hp. currently must be procured from North America, or in effect, the United States. The duty on these is also 15 percent. All other types of internal combustion engines are dutiable at 10 percent and are not restricted. As for parts, imports of pistons of 3 to 5 inches in diameter and piston pins thereof are limited to end users, while imports of all other parts are not restricted.

### ***Packaging Machinery and Materials***

With the food processing and other raw material processing industries growing in leaps and bounds, the market for various kinds of packaging materials and container making equipment is very promising. In most cases, the packaging materials are available locally—paper, burlap, cardboard, wood, polyethylene, and glass. Tin plate for can making is entirely imported, mainly from Japan. The art of container making, however, is still somewhat crude and unimaginative, and good opportunities exist or could be developed for selling machinery or for investment or licensing agreements.

There are now about nine local producers of quality cans. Most of their manual and semiautomatic equipment—from shears, stampers, roll benders, to sealers—is locally made. However, only one type of automated line is produced locally, and this turns out 120 cans a minute. Thus, some automated equipment, particularly for higher volume (300-450 a minute) production, must be imported. United States can making equipment is about 40 percent higher in price than Taiwan-made machinery. Japanese-made machines are priced about 20 percent higher than local equipment.

Thus the outlook for any large sales of American can making equipment is not very bright at this time. There are nevertheless opportunities for licensing local manufacturers in this field.

Only the one large can producer now has a can printer (under technical cooperation with a Japanese firm). Another local can maker is now negotiating with a different Japanese can printing firm for similar equipment.

The outlook for the carton making industry is much more promising. Besides the making of cartons for the expanding food processing industry, this industry will soon have a large market in the fresh fruit field. Taiwan exported \$49 million in bananas in 1965, packed in more than 7 million bamboo baskets. Banana exporters are now seeking suitable suppliers of cardboard cartons. One carton maker is already producing chemically treated waterproof cardboard cartons as samples for the banana exporters. Another has reached agreement for technical cooperation with an American firm for production of the same type carton. In addition, exporters of fresh pineapple, which is growing in importance, also expect to introduce cartons for export shipping.

Of the two main carton making factories now in production, one has one line of machinery making 3-ply cardboard and is adding a second to make 5-ply. The other has one line and is adding two additional lines all capable of making 5-ply. One line now produces about 30,000 cartons a day. There is also known to be a consortium of canners discussing the organization of yet another carton making company.

There are many bottle makers in Taiwan, but only a few can produce in large quantities. One plant belongs to the Taiwan Wine & Tobacco Monopoly Bureau, the government agency which produces and sells all alcoholic beverages and tobacco products. The Monopoly Bureau plant produces 4 million beer bottles a month from two ovens with two oil-fed bottle makers on one and two gas-fed makers on the other oven.

Another bottle maker, with one oven and two bottle making lines (oil-fed), is already making jars accurate enough for the exacting food processing industry. In general, the industry reports that the bottle making equipment from Japan is cheapest, American equipment more expensive, and Swedish machines more expensive still.

The use of glass jars in place of cans has a very definite potential. One large American buyer is al-

ready purchasing mushrooms in jars. The fact that glass jars can be made locally from local materials is also a favorable consideration. The lack of jar cap making equipment is probably the biggest single deterrent to the rapid expansion in the use of glass jars in the food processing industry here.

There is no suitable jar cap making machinery on Taiwan at the present time. One bottle making company is having difficulty locating an American counterpart interested in some form of cooperation in cap making.

The principal drawback now is small quantity demand. However, a considerable market would exist for glass jars if the caps were available locally. In addition, considerable experimentation with various types of jam makes this another potential market for jars and caps.

### **MARKET FOR OFFICE MACHINERY**

Sales prospects for office machinery are improving all the time. Though demand is not yet substantial, there is much room for market development. Total imports of all types of office machinery exceeded \$1 million in 1965, up 170 percent from 1960. United States equipment sells extremely well and has accounted for most of the increased sales. The United States share of this market in 1965 was 42 percent, with sales of \$441,000. The principal users of office machinery are government offices, banks, and foreign firms.

Specifically, the U.S. has little or no competition in electric calculators, tape labeling and marking machines, franking machines, and computers. In addition, American typewriters and dry (electrostatic) copying machines compete well against German, Japanese and Italian models.

On the other hand, American semiautomatic and manual calculators, time recorders, duplicators, and chemical copiers have proved either too expensive or unsuited to the Taiwan market. In the case of chemical copiers, the use of chemical paper is too expensive and is highly dutiable. Thus, electrostatic copiers are much preferred. United States duplicators generally use a paper size somewhat smaller than the standard paper used in Taiwan and are therefore not too saleable.

The demand for teletypes, intercom systems, and addressographs is still quite limited. Safes are produced locally. Imports of office machinery are not restricted; the duty is 30 percent.





# Selling to the Construction And Service Industries

Taiwan's dynamic industrial and agricultural growth combined with a fast rising standard of living have put pressure on the country's infrastructure to provide supporting facilities and services. The island already has a well established infrastructure compared with other developing countries. Transport, communication, health, and education facilities are among the best in Asia. Housing, sewerage, water supply, and related facilities are less well developed. All must be expanded to keep pace with the demand.

Gross output of the construction and service industries is expected to increase by about 6 percent a year to \$1.5 billion in 1968. An investment of an estimated \$580 million will be needed to carry out the specific expansion and improvement projects mapped out under the fourth Four-Year Plan. Owing to the limited domestic funds available for these purposes, however, and the general reluctance of foreign private capital to venture into these fields, the planned expansions will still barely be adequate to meet the island's requirements by 1968. Whether adequate or not, Taiwan's steady progress in developing its infrastructure, and its basic need at this stage to import most of the equip-

ment and some of the materials used in the various projects offer promising sales opportunities for United States suppliers. Indeed United States equipment and materials are already well represented in Taiwan's power and communications networks. In addition, most of the excavation and site development work on major public works projects have utilized American earthmoving equipment. Until recently, the United States AID program financed much of the United States equipment and materials imported by the construction and service sectors. Although demand is still heavy and increasing, United States suppliers will now have to compete more aggressively to maintain their high share of this market.

Appendix A contains a detailed inventory of materiel requirements of the principal construction and service industries. Generally, the equipment items shown in the inventory which must now be imported will have to be imported in growing amounts as the various expansion programs are carried out. At this stage, the economy cannot yet produce the needed heavy excavation and transport equipment or the technologically sophisticated communications and medical equipment. In the case of pharmaceuticals, however, rising local production may well reduce the present reliance on imports.

Following are U.S. products used in the construction and service industries which appear to offer the

**INDUSTRIAL GROWTH TAXES BUILDING CAPACITY:** Taiwan's industrial building surge is putting pressure on the nation's construction industry to keep pace. At left, a large new chemical fertilizer plant.



best prospects for future sales growth. During the 5 years through 1965, United States sales of the asterisked items increased at a faster rate than competitive products from other sources, and their market share has accordingly risen. Sales of the other products have also increased during this period, but less rapidly than competitors' products. Greater sales promotion is called for in those cases to meet foreign competition. (The United States percent share of the market in 1965 is given first in parentheses, followed by the United States sales magnitude in that year using the key: a. United States sales above \$1 million; b. \$500,000-\$1 million; c. \$100,000-\$500,000; d. \$50,000-\$100,000; e. \$10,000-\$50,000).

*Building and Construction Materials and Equipment:* Excavating equipment (42a), pitch and asphalt (90c), paperboards (18d), household plumbing and sanitary fixtures (70e)\*, lacquers (24e) waxes (20e)

*Transport Equipment:* Aircraft parts (99a)\*, aircraft engines (100b)\*, mechanical handling vehicles (42c)\*, electrical visual signaling equipment (11d)\*

*Communications Equipment:* Line telephonic and telegraphic apparatus (71a)\*, radio telephonic, telegraphic, and broadcasting apparatus (67b)\*; radar apparatus and radio navigation equipment (78c)\*\* switches, lightning arresters, key coils, and antenna equipment (20d)\*; insulated wire and cable solely for telecommunications use (19d)\*

*Medical Equipment and Supplies:* Surgical and medical instruments (30c); serums and vaccines (48d); vitamins (9d); miscellaneous chemical medicaments (14b)

The following United States goods used in the construction and service industries have generally declined in sales volume in the last few years. A number of factors have contributed to this decline. Most importantly, Taiwan's development and protection of import substituting industries may have simply reduced import requirements from all sources, including the United States. Import demand for some of these items could continue to go down. Others, however, have increased in overall imports, while only those from the United States have decreased. Here, the main factor is more extensive competition from third country suppliers. United States sales in this latter category (asterisked) could probably be stimulated by a more aggressive competitive effort.

*Building and Construction Materials and Equipment:* Nuts, bolts, and nails (26d); locks and padlocks (19d)\*; paints and enamels (25d)\*; fire bricks and clay (11d).

*Transport Equipment:* Railway materials and parts (39c); trucks (22c)\*.

*Medical Equipment and Supplies:* Antibiotics (21b).

Following are goods imported into Taiwan which are not supplied by the United States to any significant extent. United States sales of these items in 1965 were all valued under \$10,000, or their share of the market was under 10 percent in that year. In some cases (asterisked), Taiwan is a very limited importer (under \$50,000) of these items from any source. In other cases the United States does not produce the items and/or does not export them. In still other cases, where there is both an import demand in Taiwan and a supply capability in the United States, the meager United States sales are most likely due to a competitive problem, or lack of effort, or lack of interest. On balance, however, prospects for increased United States sales of the items listed below are rather limited and are not likely to improve greatly in the long run.

*Building and Construction Materials and Equipment:* Asbestos sheets and other manufactures, gypsum, cement\*, glass sheet and plate\*, lumber and plywood, cork and cork sheet, tiles\*, wallpaper, linoleum and floor coverings\*, worked structural shapes of metal, prefabricated forms of base metals, household switches and fixtures, varnishes, shellac.

*Transport Equipment:* Tractors and trailers, ambulances and fire engines, ships and boats, electrical sound signaling equipment, electric traffic control equipment.

*Communications Equipment:* Radio receivers, TV apparatus, radio facsimile apparatus and microphone equipment, high tension insulated cable.

*Medical Equipment and Supplies:* Sulfa drugs; plasma; miscellaneous chemical pharmaceuticals; ginseng; crude vegetable, mineral, and animal medicinal substances; dental materials, surgical and sanitary sundries of cotton.

## **BUILDING AND CONSTRUCTION**

Construction needs in Taiwan are rising sharply, particularly in urban and suburban areas where the growing industrial population is concentrating. In fact, the rate of population growth in metropolitan areas is double the overall average, creating severe problems of congestion in the streets and in housing. Also strained by the heavy urban population buildup is the availability of sanitary sewerage facilities and potable water.

The usual standard for roads and streets in city planning is 18 square yards per person. Taiwan's rate is 6 square yards per person. Only 37 percent of the city population enjoy safe potable water, while just 32 percent are served by storm sewerage and

**BUGS BEWARE:** maximum security is the rule at the Yuen Foong Chemical Industry Company's pharmaceutical plant, (at left) where these girls help produce antibiotics and several other types of pharmaceuticals.

only 1 percent by sanitary sewerage. The housing shortage in Taiwan's cities is severe and has led to the illegal, but thus far condoned, construction of squatter shacks along some city streets.

The fourth Four Year Plan calls for a total investment of \$230 million during 1965-68 to be spent on area and city planning projects. Of this sum, about \$220 million will be for actual construction and domestic procurement and \$10 million for imported materials and equipment.

The \$230 million will be allocated as follows: \$306,000 for area and city planning projects; \$26.7 million for widening 1.7 million square yards of city streets and adding 1.4 million square yards of new city streets; \$4.9 million for construction of sanitary sewerage (industrial and household waste removal); \$8.3 million for storm sewerage construction (drainage of surface water); \$11.5 million for expanding the existing water supply system by 1.6 million cubic yards of water a day for household and industrial use, and \$178 million for construction of 120,000 new housing units.

As noted, by far the greatest proportion of allocated funds are to be spent for labor and procurement of local materials. Basic structural materials—cement, bricks, stone, lumber, glass, and reinforced concrete—are all locally available, and imports of these items are negligible. Other raw materials, including pitch, asphalt, asbestos, and gypsum, are imported in moderate but increasing amounts, aggregating \$1.1 million in 1965. The United States supplied most of the pitch and asphalt, and Mexico, Egypt, and Cyprus all of the gypsum. Asbestos fiber and sheets come mainly from Canada and Japan, respectively. Although paperboards are locally produced, the quality is too poor to rule out all imports. About \$465,000 worth were imported in 1965, mostly from the United States and Japan. Heavy structural shapes, including worked and unworked structural sections and prefabricated forms, are generally imported. About \$1.6 million worth were received in 1965, mostly from Japan.

Plumbing, sanitary, and lighting fixtures and miscellaneous hardware (nails, nuts, bolts, rivets, etc., but not tools) are made domestically and, though local quality is poor, imports are restricted. Total imports in 1965 were valued at about \$600,000, supplied mainly by Japan. Only the hotels, large office buildings, and similar major construction projects are eligible end users for imported quality materials. Paints and paint materials are also locally produced, and again, though they are of poor quality, they are protected against imports. Total imports of paints, enamels, varnishes, lacquers, and similar items aggregated less than \$740,000 worth in 1965, with Japan and the United States the principal suppliers.

The main sales opportunities arising from Taiwan's building activity will be for construction machinery

and equipment, such as pile drivers, cement mixers, cranes, hoists, and excavating, earthmoving, and road construction equipment. Except for simple cranes and construction elevators, no construction equipment is produced locally. Despite heavy imports averaging \$2-3 million yearly, equipment shortages still exist. For example, although piling is a fundamental aspect of site formation for large buildings in Taiwan, there are only five old-model piledrivers on the entire island. The United States and Japan currently share most of the market for construction machinery and equipment. Imports are not restricted and the import duty is 10 percent.

Public works projects involving port and airport construction, highway expansion, and electric power, flood control, and irrigation development are discussed separately in this report.

### **TRANSPORT SERVICES**

Taiwan has a highly developed inland transport sector reaching all important cities and towns. However, the demand for passenger and freight transport services appears to be increasing faster than new facilities can be added. The Government has ambitious expansion plans for both the railway and highway sectors to try to keep up with rising demand. These programs should present United States suppliers with sales opportunities for railway rolling stock, commercial vehicles, vehicle parts, traffic control equipment, and construction equipment.

The main development emphasis will be on expanding the railway system, the principal means of transport on the island. Over 80 percent of Taiwan's freight traffic is carried by rail and nearly half the island's passenger traffic. Railway freight traffic is expected to increase by about 2 percent annually to a total of 1.4 billion ton-miles by 1968, while passenger traffic should grow at an average annual rate of 4 percent to a total of 2.5 billion passenger-miles.

The Government's Taiwan Railway Administration (TRA) operates West Line and East Line systems with a total length of 606 route miles. The West Line system consists of a 255-mile trunk line and 243 miles of branch lines linking the two main ports of Keelung and Kaohsiung and serving most of the industrial centers and key cities over western Taiwan. The 110-mile East Line joins Hualien port with Tatung along the eastern Pacific coast. The greatest part of both lines is single track, but the track gauge on the West Line is 42", while that on the East Line is only 30". In addition to TRA's system, there is substantial narrow-gauge trackage (about 1,700 miles) operated by the mining, forestry, and sugar industries. Rails weighing 81.4 lbs. per meter are mainly used on TRA's West Line and those weighing 48.4 lbs. per meter on the narrow-gauge lines. Rails can be made locally, but about 3,900 tons (\$525,000 worth) were imported

from Japan and Germany in 1965. Railway ties are also produced locally and in sufficient quantity for export.

TRA's motive power and rolling stock in 1965 consisted of 215 steam and 64 diesel locomotives, 90 railcars, 746 passenger coaches, and 7,000 freight wagons. Complete dieselization of the system is the main ultimate objective. Other TRA property includes 10 marshaling yards; a new diesel locomotive maintenance center fully equipped to handle 200 diesel locomotives; several workshops, roundhouses, freight sheds, and depots; and a large number of grade crossings and bridges. Some automatic block systems and centralized traffic control systems have been installed; the main stations are equipped with all relay interlocking plants or electro-mechanical interlocking plants; and some of them have new teletype equipment. However, improvement of many TRA facilities is still needed.

TRA's proposed modernization and expansion program for 1965-68 will cost an estimated \$39 million. At least \$20 million of that will be for imported rolling stock and equipment to be financed by a

World Bank loan. The imports will include 22 diesel locomotives at 1,400 hp., 12 diesel locomotives of 600 hp., and 21 diesel locomotives of 900 hp. (\$8.5 million); 25 diesel railcars, 6 trailers and 30 reversible-chain coaches (\$2.6 million); components for 74 reversible-chain passenger coaches and 15 baggage cars (\$1.5 million); components for 1,065 freight wagons (\$3 million); centralized traffic control, automatic-block signaling and grade crossing equipment (\$2.2 million); and equipment for constructing a new marshaling yard (\$1.2 million). TRA will make its own passenger coaches and baggage and freight wagons. Procurement of the imported equipment will be handled through the Central Trust of China and will be open to worldwide competitive bidding. There are no import restrictions on rolling stock or railway equipment; the duty is 5 percent.

Motor transport is gaining in importance in Taiwan. Over half the total passenger traffic and 20 percent of freight traffic were carried by bus, taxi or truck in 1965. Highway freight traffic rose by 92 percent from 1960 to 1965 to 365 million ton-miles, while passenger traffic increased by 52 percent to 2.9 billion passenger



**HANDLE WITH CARE:** both the building construction and roadbuilding industries use the output of the commercial explosives plant of the Atlas Taiwan Corp. at Kaohsiung. The plant is a joint venture involving the Atlas Chemical Industries of the U.S.

miles. By 1968, further increases of about 40 percent and 19 percent, respectively, are expected. To meet the increased load, more trucks and buses will be needed.

At the end of 1965, there were about 5,000 buses and 6,200 trucks registered on the island which carried about 393 million highway passengers and 15 million tons of highway freight. About 50 percent of the buses and 65 percent of the trucks are overage and should be replaced. In recent years, new bus and truck registrations have averaged roughly 450 and 1,500 a year, respectively. Under the fourth Four Year Plan, 1,870 new vehicles will be procured, including 307 new buses for the Taiwan Highway Bureau's Fleet, 285 buses for city bus companies, 353 buses for private bus companies, and 925 trucks for private trucking companies.

There is only one producer of motor vehicles in Taiwan. In 1965, that producer assembled 944 trucks and buses and 2,317 passenger sedans (nearly all taxicabs). Passenger sedan imports are restricted to protect locally assembled cars. Trucks can be imported by the trucking companies without restriction, but only with self-financed foreign exchange. Most buses are imported by the Government-owned Taiwan Highway Bureau, which operates the largest fleet in Taiwan. The United States and Germany have been the chief suppliers of buses, while Japan and the United States have shared the truck market. The duty on all commercial vehicles was reduced in 1965 from 40 percent to 35 percent.

The increased highway traffic expected over the next several years will also require considerable improvement and expansion of the highway network. Highway mileage in Taiwan has not increased significantly in the last several years. Total mileage in 1965 was 10,130 miles, making density of highway network—73 miles of highway per 100 square miles of surface land—second only to Japan in Asia. However, except for the 250-mile North-South paved highway along the western coast, road conditions are rather poor. The roads are often too narrow, improperly drained, and lack suitable surfaces and roadbeds. Over 80 percent are either gravel or dirt roads. The Government's main highway development efforts over the next several years, therefore, will emphasize paving, repairing, and widening roads to accommodate heavier traffic and axle load requirements. Asphalt is produced locally, but roadbuilding and repair equipment will have to be imported. Total investment in the road transport sector; including that for vehicle procurement, should approximate \$53 million during 1965-68.

Road congestion, particularly in the cities is a serious problem. There is a need for traffic control and safety equipment, which in due course will create a demand for imports of such devices. Accordingly,

United States suppliers might well anticipate that demand and establish contact with the appropriate municipal authorities.

Sea transport facilities are also inadequate. The rapid increase in seaborne trade, particularly since 1962, has strained the island's cargo-handling capacity, while Chinese ships are no longer carrying as large a share of that trade as before. Crash Government programs to ease both the harbor and shipping problem are underway.

Acute congestion developed for the first time in 1965 at the two main ports of Kaohsiung and Keelung. Foreign trade is apparently increasing faster than construction of new port facilities. Yearly cargo-handling capacity at Kaohsiung, Keelung, and the smaller port at Hualien is about 9-10 million tons. Actual cargo traffic in 1965 was 9.8 million tons, and by 1968 it could increase by 20-30 percent to 12-13 million tons. To meet this demand the Taiwan Provincial Government (TPG) will invest some \$9.7 million through 1968 to expand all three harbors, and another \$15.7 million to build a second commercial harbor at Kaohsiung. These programs will involve land reclamation; dredging of deep water channels; construction of deep water wharves, transit sheds, warehouses, and access roads; installation of mooring buoys; expansion of mechanical cargo-handling equipment; and renovation of ship repair facilities. All construction will be done by the Harbor Bureaus of each port.

U.S. suppliers of harbor dredging and construction equipment and shipbuilding and repair machinery should find excellent sales opportunities arising from these programs, since nearly all the equipment will have to be imported. The main imported items should include tugs, dredgers, buoys, floating cranes, mobile cranes, wharf cranes, crane upper machinery, forklift trucks, tractors, trailers, road rollers, tractor shovels, pile drivers, hydraulic rams and pumps, electric hoists, and various machine tools (lathes, shapers, boring, milling, and grinding machines, and pipe and angle bending machines).

The shipping problem, though less critical, is costing Taiwan substantial sums annually in lost service income. Only about a third of the island's payments for ocean freight goes to Chinese shipping companies. The Republic of China has the fourth largest merchant marine in Asia, but this fleet's operations are confined mainly to river and coastal waters and to the China Seas. It carries less than half of Taiwan's international cargos. By 1965, fleet tonnage had been increased to just over 1 million d.w.t., comprising 145 vessels of various types. Many of the ships, however, are obsolete and need to be replaced. Ninety-four of the vessels were built prior to 1948, including at least 70 built before 1946. By 1968, Taiwan plans to add at least 500,000 d.w.t. to its fleet, for a total of nearly

1.5 million d.w.t. and a mean age under 15 years. But even this will not eliminate the deficit in shipping payments. Under present planning, a favorable balance probably cannot be attained before 1975. Total investment in the shipping industry during 1965-68 is projected at \$59 million.

Taiwan's shipbuilding industry will not be able to supply very many of the ships needed. The one large shipbuilder on the island—Taiwan Shipbuilding Corporation (TSBC)—has built only two 36,000-ton oil tankers and two 12,000-ton freighters in the last decade. In 1965, TSBC signed a licensing agreement with a Japanese firm under which the local firm is to build three 15,000-ton and ten 1,000-ton ships annually. Even if these ambitious plans materialize, Taiwan's fleet will still be short some 326,000 tons by 1968, and additional ships may have to be imported.

New regulations affecting imports of foreign vessels were promulgated in 1965 by the Ministry of Communications. All foreign ships purchased must be at least 7,000 tons for ocean service and 3,000 tons for coastal use, and the ships may not be older than 7 years. For irregular service, ships must not be less than 2,000 tons or older than 12 years. All ships bought under these criteria will be free of duty. Ships imported for scrapping purposes are dutiable at the same rate as scrap iron, 10 percent.

Taiwan's civil aviation facilities serve mainly the passenger trade and have generally kept pace with the limited passenger flow. However, Taiwan is beginning to attract more and more of the huge tourist flow going to Japan and Hong Kong each year, and some expansion of airport and passenger facilities will be needed. The total number of incoming and outgoing flights at all airports more than doubled from 8,300 in 1960 to about 17,000 in 1965. Airline passenger traffic during the same period rose from 122,000 to about 500,000. By 1968, the passenger flow could increase by an additional 40 percent to around 700,000.

At present, the island has only one international airport, located in Taipei. There are 7 smaller airports at Taichung, Tainan, Kaohsiung, Makung, Taitung, Hualien, and Sun Moon Lake handling domestic flights and private aircraft. Taipei International Airport is equipped with ICAO (International Civil Aeronautics Organization) standard Instrument Landing System and other ICAO-approved air navigation, traffic control, and telecommunication facilities. Eight jets and 3 piston planes can be accommodated at one time. The main runway is 2,850 yards long. A new \$1-million passenger terminal with modern convenient services was added in 1964.

To accommodate the large increase in tourist traffic expected over the next several years, Taiwan will add facilities to the present airfield at Kaohsiung (Hsiao-Kang Airport) so as to form a second international

airport. The first phase will include construction of a 1,750 yard runway, a connecting taxiway and apron, and a passenger terminal, plus installation of air navigational aid facilities. In the second phase, the runway will be extended to 2,850 yards. The project will be undertaken by the Civil Aeronautics Administration. All navigation equipment will be imported through the CTC and will include two 50-watt VHF transmitters and fix-tuned receivers, a DCB-36 type rotating beacon, a standard free-floating wind tee, a PTS type signal projector, and aerocom M-1000D locator, and miscellaneous meteorology observation equipment (barometers, thermometers, psychrometers, barographs, thermographs, and hydrographs). The total investment required to carry out this and all other civil aviation expansion projects during 1965-68 is estimated at \$2.6 million.

The Republic of China's flag carrier—Civil Air Transport (CAT)—serves only countries in the Asian region. A second domestic airline—China Air Lines (CAL)—hopes to begin service outside Taiwan and may eventually share some of CAT's overseas runs. CAT has the only jet carrier, a Convair 880 M, while CAL is using DC-4's on its longer domestic runs. However, if service to other Asian countries expands, either CAT or CAL may need an additional jet. Also, as tourist traffic within Taiwan picks up, CAL or the other two domestic carriers—Foshing Airlines and Far Eastern Air Transport Corporation—may want to procure additional propeller planes and possibly some helicopters.

No aircraft or parts are locally produced on the island. All aircraft maintenance is done by Air Asia Co., Ltd., at Tainan under contract of the several airlines. Air Asia's shops are well equipped, but new maintenance machinery will need to be imported from time to time. Imports of aircraft engines and parts are substantial, reaching \$3.1 million in 1965 and supplied almost entirely by the United States.

### **TELECOMMUNICATIONS SERVICES**

Taiwan's fast growing telecommunications network is still inadequate. The demand for service, spurred by rapid industrialization, has grown faster than system expansion. Although the Government's Taiwan Telecommunications Administration (TTA) has steadily added new facilities, the day is yet remote when full demand can be serviced effectively. Hence, TTA must continue its expansion programs. U.S. suppliers should benefit greatly, since much of TTA's existing equipment is United States made, and additional facilities should be complementary.

TTA's main emphasis has been on expanding domestic telephone plant capacity. From 1960 to 1964 alone, TTA added 45,000 new automatic telephone lines for local calls and 300 microwave circuits and 801 short-haul circuits for toll calls. Further additions

in 1965 brought the total system capacity in that year to 120,150 city telephone lines, 2,264 long-distance telephone channels, and 1,826 public telephone pay stations. About 60 percent of the city telephone lines were automatic (lineswitch type) in 1965. Eventually all the manual magneto-type switchboards installed in the remaining lines will be converted. The long-distance telephone network consists of open wire, underground cable, VHF, and the newly installed microwave radio system. More than 70 percent of Taiwan's toll calls are now handled by a nondelay or CLR (Combined Line and Recording) system.

Even with these new facilities, however, TTA has barely kept pace with the demand for service. TTA still had a large backlog of applicants for telephone service in 1965. The 1965 telephone density (telephones per 100 persons) of 0.78 was well below the rate in Japan and Hong Kong (more than 5 and 3 per 100 persons, respectively). It is also considerably below TTA's own goal of at least 2 telephones per 100 persons by 1968. As with local telephone service, the demand for long-distance service is also straining the system's present capacity. In late 1966, TTA began negotiating with the World Bank for an \$18.3-million loan to help finance a \$50-million project for further improvement of Taiwan's telephone system. This plan includes the installation of an additional 118,000 city telephones, an addition of 240 circuits to the existing microwave long-distance call system linking major cities on the island, and the establishment of a direct-dialing network linking Taipei, Taichung and Kaohsiung.

Under this major expansion plan, TTA will be needing substantial new telephone communications equipment. Most of it will have to be imported, particularly central office switching equipment and dial exchange and operator toll dialing equipment. Ancillary air-conditioning and power supply (batteries, rectifiers, and gasoline engine-generators) equipment will also have to be imported. Existing automatic equipment in TTA's plant is mostly United States-made, and consists of the step-by-step direct control type, either of Siemens-Halske type F or Strouger type. New procurement will most likely be of the same type. Taiwan can supply its own outside plant materials and station apparatus, including cable and wire, terminals, conductor and pole line materials, telephone sets and protectors, and manual switchboards and accessories.

The demand for domestic telegraph services has also grown sharply in Taiwan, despite competition from the toll telephone facilities. The number of telegraph messages sent more than doubled from 1960 to a total of 1.1 million in 1965. During the same period, TTA expanded its domestic telegraph circuits from 256 in 1960 to 331 in 1965. As the demand picks up, TTA will add more circuits and continue to modernize

its telegraph facilities. To that end, additional teleprinters (English and Chinese), line concentrators, and facsimile equipment will have to be imported.

TTA's microwave radio system was completed in 1964 at a cost of \$4.1 million. It serves as a "backbone" communications network for linking all large cities along the western coast for long-distance telephone, telegraph, and leased circuit services, including TV. The entire system covers a total airline mileage of about 218 miles between the terminal stations of Taipei and Kaohsiung. Signals are relayed across the intervening space by four through-repeater stations and two drop-repeater stations. The system is designed for multiplex operation of up to four radio channels, each capable of providing 1,800 telephone circuits. Thus ultimately 7,200 telephone circuits can be made available. However, in the initial phase completed in 1964, just one radio channel with 300 telephone circuits was installed. As the traffic demand picks up, more circuits will be added, and additional equipment will have to be imported.

Since all the initial microwave equipment was U.S. supplied, it is likely that any additional equipment for the system will also be procured from the United States. The principal imported items should include the microwave (R.F.) and carrier equipment, engine generator and voltage regulators, air-conditioning equipment, testing instruments and tools, and steel towers and tower lighting equipment.

Taiwan's total imports of telephone and telegraph apparatus have averaged between \$1.5 and \$2.5 million a year since 1960. In 1965, imports rose to \$4.8 million, supplied almost entirely by the United States and Japan. There are no restrictions on imports of line telephone and telegraphic apparatus and parts, and the duty is 15 percent. However, radiotelephonic and telegraphic equipment may only be imported by TTA, and the duty is 20 percent.

Taiwan's international telecommunications services include international telegraph, telephone, facsimile, telex, leased circuits, newscast, and recording. In recent years, considerable new equipment has been added to keep pace with rising demand, including radio-telephone terminal equipment, additional high-powered radio transmitters and high performance receivers, radio-telegraph, radio-telephone, facsimile equipment, microwave length, a new time-division ARQ multiplex, a long-distance VHF forward scatter system, and international telex facilities.

With demand for services increasing steadily, further system expansion will be required. Emphasis under the fourth Four Year Plan will be put on expansion of the existing communication system by increasing the capacity of the equipment for telegraph, telephone, facsimile, and other services by adopting new types of machines and new methods of communication, improving the quality of communication, offering



new services, and establishing, step by step, an automatic remote control system. Efforts will also be made to participate in the international plan of developing a telecommunication network and in the satellite communication program, and to establish a troposcatter system between Taiwan and Hong Kong as well as a standard frequency broadcasting station.

Principal construction items for the fourth Four Year Plan are:

1. Expansion and modernization of communications facilities:

... Additional telegraph facilities including new type and high efficiency teletype, time-division ARQ multiplex, automatic or semiautomatic telex, and testing instruments;

... Additional radio voice terminal facilities including terminal equipment, high-efficiency scrambler, automatic volume control, and testing equipment;

... Additional facsimile facilities including new types of transmitters and receivers, modulators, and testing instruments.

... Additional radio facilities including powerful multiplex transmitter, precision receiver, accessories of transmitters and receiver, large high-gain directional antennas, and testing instruments;

... Additional link facilities including remote control circuits, carrier equipment, microwave and VHF linking equipment, and testing instruments;

... Additional frequency monitor facilities including frequency meter, monitor antennas, mobile monitor facilities, standard frequency equipment, standard-frequency broadcasting equipment; and

... Additional power supply facilities and accessories including different kinds of power supply and their accessories.

2. The proposed additional direct circuits and telex subscribers are:

|                                  |            |
|----------------------------------|------------|
| Taipei-Hamburg telegraph .....   | 1 channel  |
| telex .....                      | 1 channel  |
| Taipei-Singapore telegraph ..... | 1 channel  |
| telephone .....                  | 1 channel  |
| telex .....                      | 1 channel  |
| Taipei-Hong Kong telephone ..... | 3 channels |
| telex .....                      | 1 channel  |

New telex subscribers in Taipei—100 subscribers.

3. Establishing of the troposcatter system between Taiwan and Hong Kong and linking Taiwan with Europe, America, and Southeast Asia.

Radio and TV broadcasting networks extend to all parts of the island. There were more than 70 radio broadcasting stations throughout Taiwan in 1965, or at least one in each county and municipality. They are all privately owned and operated under the supervision of the Ministry of Communications. About 5 stations are added each year. The total number of transmitters exceeded 150 in 1965 with total installed transmitting

capacity of about 1,240 kw. The Broadcasting Corporation of China (BCC) operates the largest network with 10 stations, 63 transmitters, and total output of 1,053 kw. in 1965. The other two large networks are the Armed Forces Radio Network and the Cheng Sheng Broadcasting Company. The remainder are small stations of 1-3 kw. capacities. There were some 1.4 million radio receiving sets in Taiwan at the end of 1965, with about 1.7 million anticipated by 1968.

BCC's island-wide relay system consists of telephone carriers, a microwave system, and a VHF system. A relay station in northern Taiwan and one in central Taiwan link the VHF system. A reverse relay system from central, eastern, and southern Taiwan to Taipei is being established. BCC's transmitting power has been stepped up 10 times in the last 16 years from 100 kw. to 1,053 kw. The largest medium-wave transmitter is 150 kw., and the largest short-wave transmitter is 50 kw. To achieve high-power gain, all BCC's directional short-wave antennas are rhombic and curtain type. For medium-wave, high-power transmitters, 3-tower or 4-tower directional antennas are used to step up the transmission power 3 or 4 times. For small medium-wave transmitters, BCC uses duplexors or triplexors to connect 2 or 3 transmitters together to a single vertical antenna to save ground space. BCC is seeking a loan to finance construction of a 1,000-kw. medium-wave broadcast transmitting equipment for operation in 1967.

Taiwan has one educational and one commercial television station. The latter is operated by the Taiwan Television Enterprises (TTE), and is located in Taipei. Commercial telecasting first began in October 1963 and covered only northern Taiwan. A microwave extension to Kaohsiung was completed in 1965, and the entire island is now able to receive TTE's broadcasts. To spur sales of TV sets, now running about 1,500 a month, local dealers are urging the Government to permit additional stations to be set up. There were about 60,000-70,000 TV units in operation at the end of 1965, and 177,000 expected by 1968.

Japanese interests hold much of TTE's stock, and all of its installed equipment is Japanese. TTE has a total transmitting power of 252 kw. The U.S.-Japanese NSTC systems are in use, and presumably U.S. equipment could be used if other stations are established. Color television is at least 5 to 10 years away from adoption.

TTE is interested in importing more TV films. The fiscal 1966 quota has been set at 986 foreign films (16mm.), of which 786 can come from the United States. Not affected by the quota are newsreels no longer than 410 feet; documentaries no longer than 820 feet; advertising films less than 130 feet; and cartoons less than 985 feet. Chinese subtitles are inserted by TTE. The duty is 15% except for newsreels and educational films which are duty free.

## HEALTH SERVICES

Taiwan has one of the better public health networks in Asia and one of the highest standards of general health in the area. The crude death rate is only 6.1 per 1,000 persons, one of the lowest in the world, and life expectancy is 63 years for males and 67 years for females, among the world's highest.

The provincial Government spends roughly 4 to 5 percent of its annual budget on health care and control. About \$4 million was expended for this purpose in 1965, mainly to provide public health and medical care services, to control communicable diseases, to control food and drugs, to improve environmental sanitation, and to improve hospital facilities. Another \$17 million is to be spent for these purposes during 1965-1968. The import market for medical equipment and supplies (\$622,000 in 1965), though not yet large, is expanding. It could become quite significant because of the growing recognition that health and economic development go hand in hand, and because present facilities are generally inadequate. The market for pharmaceuticals, however, is very large even now. About \$7 to \$10 million worth of drugs a year are imported annually, mainly from Japan, the United States and Italy.

In 1965 Taiwan's public health network consisted of 22 health bureaus, 578 health centers and offices, 441 mobile medical units, 27 general hospitals, 3 maternity hospitals, 4 communicable disease hospitals, 20 TB centers and control stations, 3 sanitariums, 1 health laboratory, and 3 quarantine stations. In addition, there are 17 hospitals run by Government corporations, 22 missionary run hospitals, 170 private hospitals, and more than 5,800 private clinics, including 300 dental clinics. Altogether, there are more than 12,000 hospital beds on the island—or about 1 bed per 1,000 persons. Physical and diagnostic facilities in the Government hospitals greatly need to be improved, but lack of funds has thus far limited progress in that direction.

Taiwan is one of the best doctored countries in the area. In 1965, there were 23,000 registered medical personnel on the island, including about 8,400 physicians, 2,400 herb practitioners, 1,400 dentists, 2,100 pharmacists, 4,100 nurses, and 4,500 midwives. The ratio of medical personnel to population in 1965 was about 1.32 per 1,000 persons. Many of the doctors have had training in the United States and are familiar with American equipment. Nevertheless, most of the equipment sold in Taiwan is Japanese made, mainly because the Japanese have been more active in their sales effort and partly, too, because some of the local doctors were trained in Japan. Imports of surgical, medical, and dental instruments and parts have averaged about \$500,000 a year since 1960, and reached \$622,000 in 1965. Japan and the United States are main suppliers. The fourth Four Year Plan

projects import costs during 1965-68 at about \$1.1 million, or roughly \$275,000 a year. This estimate may well be exceeded.

Through mass immunization, improved environmental sanitation, and popular use of chemotherapeutic drugs, great progress has been made in eradicating disease on the island. Nearly all of the dreaded communicable diseases either are under control or have been eliminated. For example, there have been no cases of plague, smallpox, rabies, typhus, relapsing fever, yellow fever, or scarlet fever in many years. An outbreak of cholera in 1962 was the first in more than 10 years. Intestinal infections—typhoid, paratyphoid, and dysentery—have declined gradually. Tuberculosis, diphtheria—pertussis, trachoma, poliomyelitis, and venereal diseases are still serious menaces to public health. In addition, because of the moist tropical climate, the traditional use of excremental fertilizer in vegetable gardens, and the prevalence of arthropods (mosquitos, ticks and mites, fleas, etc.), the island suffers heavily from parasitic diseases (particularly hookworm, ascariasis, tapeworm, ancylostomiasis, and trichuriasis), and arthropod diseases (notably filariasis, encephalitis, and scrub typhus). On the other hand, malaria, long a scourge of the Far East, has been virtually eliminated. Overall, the major causes of death in Taiwan (other than suicide, violence, and other external factors) include vascular lesions of the central nervous system, pneumonia, TB, neoplasms, heart diseases, gastro-entero-colitis, diseases of early infancy, nephritis and nephrosis, and bronchitis.

Of the chief causes of disease, poor sanitation is a particularly serious problem in Taiwan. About half the rural population lacks safe water, which accounts for the extremely high rate of worm infections and the abundance of mosquitos and other arthropods. To improve the island's environmental sanitation, the Taiwan Provincial Government will carry out a \$6.3-million program in 330 villages during 1965-68. This program will involve construction of tap water and sewage systems, and public bath-houses and toilet facilities. Specifically, 238 rural waterworks, 24,000 public wells, 40 rural drainage systems, 30,900 public toilets, 8 improved market places, and a number of compost plants with a total capacity of 40 tons are to be built.

Although the steady improvements in medical facilities and environmental sanitation have had a marked beneficial effect on general health, the greatest success in controlling and eradicating disease on the island is due to the widespread use of vaccines and chemotherapeutic drugs, particularly antibiotics and sulfa drugs. Imports of these and other pharmaceuticals are very high, averaging over \$9 million annually during 1961-65. However, the existence of a large internal market for medicines prompted the development of a



**MARCHING TO THE BREAKFAST TABLE:** bottles of whole milk roll along the line at the Wei Chuan Foods Corp. dairy plant. A vigorous sanitation program is making headway against Taiwan's diseases.

local pharmaceutical industry, and the Government has encouraged it through import protection in order to cut down foreign exchange losses. Faced with gradual erection of barriers against pharmaceutical imports in finished form, about 12 U.S. and Japanese pharmaceutical firms have set up local assembling operations, and another 16 have licensing agreements with local firms. In addition, one U.S. firm has invested in a plant to produce the raw materials themselves.

There are now about 1,000 registered pharmaceutical plants on the island and about 22,000 kinds of imported and locally produced medicines and medical products. The raw material producers are making glucose, caffeine, soda, and five kinds of antipyretics and analgesics (sulpyrene, aminopyrene, phenacetin, antipyrone, and acetanilide). Imports of these in both raw material and finished form are restricted.

The Government believes that the following additional raw materials could be produced locally and is encouraging foreign firms to consider investments to produce them: Glucuronic acid, ascorbic acid, sulfa drugs, enzymes, and aminosalicic acid. The local assembling plants are importing raw materials for making chloramphenicol, herbal products and about

1,200 kinds of vitamins, nutrients, tranquilizers, and hormones. These may no longer be imported in finished form. In addition, local assembly of four types of antibiotics, particularly the tetracyclines, and five varieties of sulfanomides has expanded to the point where import controls on the finished products may soon be imposed.

On the whole, imports of pharmaceuticals have remained fairly steady over the last few years, with the decrease in assembled products offset by the increase in raw materials. This condition will likely prevail until more firms get into local production of raw materials.

The principal imports (valued above \$100,000 each) are antibiotics (mainly penicillin, streptomycin and dihydrostreptomycin, tetracyclines and derivatives, chloramphenicol, erythromycin, and novobiocin), sulfa drugs (sulfadiazine, sulfa guanadine, sulfa merazine, sulfanomide, sulfa mezathine, thiasin, domian and others), vitamins, central nervous system depressants, gastrointestinal agents, anti-infectives, nutrients, hormones, autonomic drugs, enzymes, hematological agents, cardio-vascular agents, antihistamines, and dermatological agents. Of these, increasing im-

ports of sulfa drugs, gastrointestinal agents, autonomic drugs, enzymes, cardio-vascular agents and dermatological agents appear likely, while imports of vitamins and hormones will probably fall off sharply. The others will continue to enjoy high but steady import levels. Of the pharmaceuticals now imported in values below \$100,000 a year, the following appear likely to increase over the next several years: Serums and vaccines, central nervous system stimulants, local anesthetics, oral contraceptives, detoxication agents, and antineoplastic agents.

All imported medicines must be approved in advance by the Ministry of Interior (MOI). For this purpose, MOI requires, (1) certificate of origin issued by the health authority in the country of origin, (2) a statement from that authority certifying that the particular item is permitted to be freely sold in the country of origin, (3) full details of the prescription and contents of the drug, together with qualitative and quantitative analytical methods furnished by the manufacturer, (4) submission of about eight original samples (with complete label and package) for analysis and registration, and (5) a supply of appropriate clinical and pharmacological literature. Appointment of a local sales agent in Taiwan is also required.

Import duties on some pharmaceuticals were revised in 1965. Duty reductions were allowed for chemicals solely for compounding into medicines (from 22.5 to 15 percent), non-medicament antibiotics (17.5 to 15 percent), non-medicament sulfa drugs (22.5 to 20 percent) and medicament sulfa drugs (32.5 to 30 percent). Increased duties were put on medicament antibiotics (22.5 to 25 percent), medicament vitamins

(32.5 to 35 percent), and miscellaneous medicaments (32.5 to 35 percent). Unchanged were serums, vaccines, and plasma (5 percent), non-medicament vitamins (22.5 percent), and chemicals solely for processing into medicines (22.5 percent).

Effective quality control over the production and vending of drugs is becoming more difficult as their availability increases. Antiquated regulations and lack of administrative funds and personnel have enabled local producers and importers to market substantial quantities of unlicensed, inferior drugs. Some of these drugs, moreover, are unsafe copies of well-known, reliable brands. The problem is compounded by the fact that nearly all medicines, including antibiotics and other potentially injurious drugs, can be purchased over the counter at any of the 13,500 or more drugstores on the island.

Since 1959, the Government has acted to improve the quality of local production, but progress has been slow. Of the 1,000 producers, about 700 were using acceptable quality control equipment and procedures in their plants in 1965. The remaining factories are turning out substandard products. The Government has stipulated that the latter firms must bring their factories up to the prescribed standards within a specified period of time or lose their licenses. New pharmaceutical producers will not be permitted to start up unless the factory is fully and adequately equipped. In this connection, U.S. suppliers of pharmaceutical manufacturing and quality control equipment might find good sales opportunities. Another potential customer for laboratory and testing equipment is the Food and Drug Bureau which the Government plans to set up.

# Selling to the Farm Sector

Despite the great industrial progress made in the last decade, agriculture is still the mainstay of Taiwan's economy. About half the population depends directly on farming. Primary and processed farm products account for 56 percent of total exports and nearly 90 percent of the island's total food consumption. A wide variety of food, feed, and cash crops are grown. Rice, sweet potato, peanut, vegetables, soy bean, wheat, corn and rapeseed are the main food and feed crops, while the cash crops include sugar cane, pineapple, tea, banana, citrus fruit, mushrooms, asparagus, citronella, tobacco, jute, sisal, and flax. Only wheat, soy bean, and some dairy products are imported in large quantities.

Although farmland is Taiwan's most important natural resource, only small portions are arable. Only a fourth of total land area, about 2.2 million acres, can be cultivated. This includes large tracts of slope and foothill lands difficult to farm. Moreover, soils are generally poor; they lack sufficient mineral plant foods (nitrogen, phosphorus, and potash), and are subject to rapid chemical decomposition, leaching and erosion. These problems are further compounded by the small size of farm units. Overpopulation (1,660 farmers and dependents per square mile of arable land) has reduced average arable acreage per farmer to about 0.4 acres.

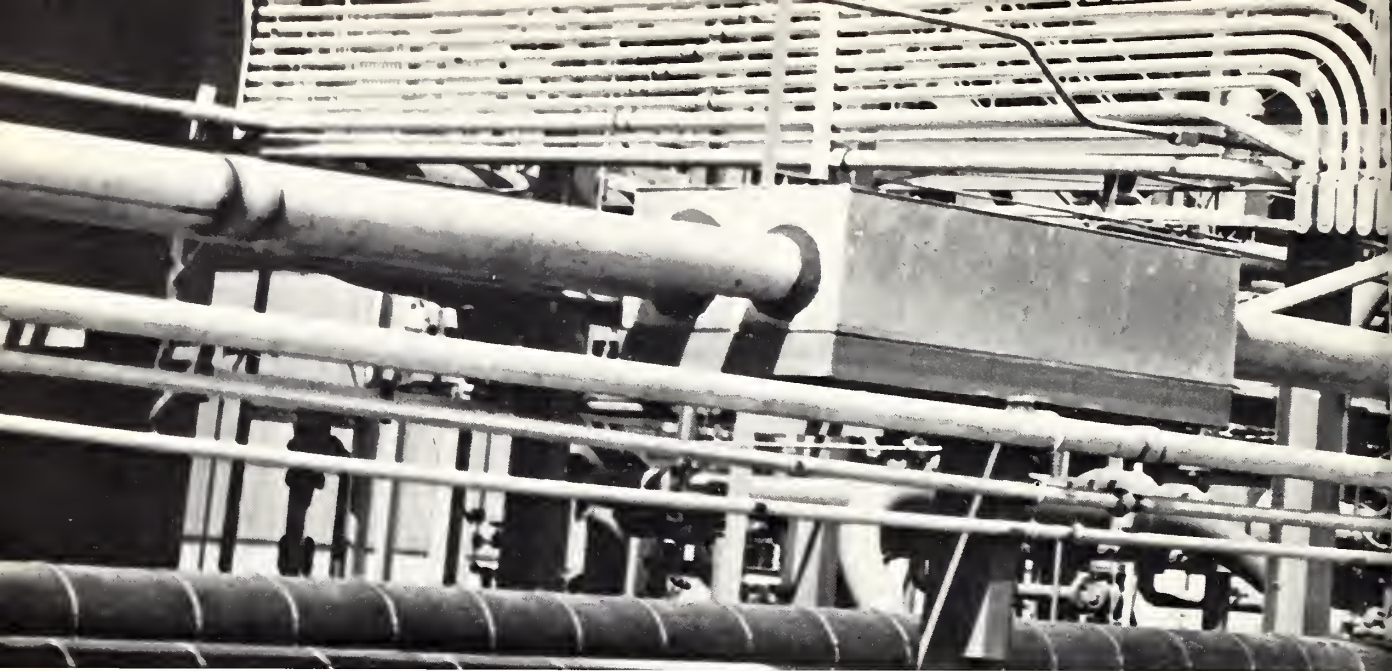
Farm plots range in size from less than 1½ acres in suburban Taipei to 5-7½ acres in the Miaoli-Hsinchu foothills and in Taitung. Throughout the fertile alluvial plains in Chianan, Pingtung, and Ilan, farm size averages between 2½ and 5 acres.

Rapid population growth (3 percent a year) and

scarcity of arable land make necessary the extraction of the highest possible yields from the soil. Otherwise, more food would have to be imported, an intolerable luxury for the economy at this stage of development. Fortunately, Taiwan farmers, like the Japanese, excel at their trade and now produce enough for both local needs and export. Only a few food products not grown on the island have to be imported. The great obstacles are being overcome mainly through hard work (very few farms are mechanized); multicropping; liberal irrigation; heavy doses of fertilizer, pesticides, weed killers, and other agricultural chemicals; and use of better seed varieties.

These efforts, together with continued growth of the food processing industries utilizing domestic crops, and further expansion of export markets for primary and processed farm products should permit a reasonably bright future for the agricultural sector. Growth in agricultural output averaged about 6.9 percent a year from 1960 to 1965. Under the fourth Four Year Plan, output is expected to increase further by about 4 percent each year to a value of \$730 million by 1968. To achieve this goal, an estimated \$314 million will be invested into the agricultural sector during the 1965-68 period.

Local industries that will help meet the farmers' basic needs have sprung up quickly in the last few years. Taiwan can now make most of its fertilizer and some of the equipment for its irrigation facilities, insecticides, farm implements, and farm machinery. Eventually, local production may replace currently large imports but, except for fertilizers, this prospect is still distant. Total imports of farm raw materials



**PARTNERSHIP WITH U.S. FIRMS:** many projects which require a high level of technical know-how are partially

and equipment (excluding food and sulfur) amounted to \$24 million in 1965 compared with \$26.5 million in 1960.

Appendix A contains an inventory of production materials and equipment required by the farm sector, indicating the extent to which these items are available locally or must be imported.

### **FERTILIZER**

The fertilizer sector is the industry that comes closest to meeting local needs. Nine plants are producing calcium cyanamide (20%N), nitrochalk (20%N), ammonium sulfate (21%N), urea (46%N), nitrophosphate (16%N, 14%P), calcium superphosphate (18%P), and compound fertilizer (20%N, 5%P<sub>2</sub>O<sub>5</sub>, 10%K<sub>2</sub>O). Eight of the nine are Government owned, seven by the Taiwan Fertilizer Corporation (TFC) and one by the Kaohsiung Ammonium Sulfate Corporation (KASC). The other is a \$22-million joint venture by Socony-Mobil, Allied Chemical, and the Chinese Petroleum Corporation.

Over 1 million tons of nitrogenous and phosphatic fertilizers were produced in 1965, more than double the 1961 output of 413,000 tons. Total imports of all fertilizers have correspondingly declined from about 434,000 tons in 1961 to 400,000 tons in 1965 (\$17.4 million worth).

Taiwan had expected to be self-sufficient in nitrogenous fertilizer by 1965. However, despite sharply increased local production, Taiwan farmers have not yet adjusted to local nitrogen fertilizers. On the one hand, they prefer ammonium sulfate, which is not yet produced in sufficient amounts, to the more abundant

urea. On the other hand, they prefer the Japanese ammonium sulfate to the local variety, even though the ingredients are identical. Consequently, over 110,000 tons of ammonium sulfate and 72,500 tons of other nitrogenous fertilizer were imported from Japan in 1965 at a cost of \$9.4 million.

These imports will probably be cut off or sharply reduced after 1968. By that year TFC will have completed a \$21.5-million project to rebuild its Hsinchu plant. The projected annual output of that plant—145,000 tons of ammonia, 110,000 tons of urea, and 160,000 tons of ammonium sulfate—combined with production at the nine existing plants, should increase nitrogen output to about 236,000 tons, compared with the projected local requirement for nitrogen of about 158,000 tons in 1968.

Except for sulfur, all the raw materials used in nitrogenous fertilizers are available locally, including natural gas, coke, ammonia, sulfuric acid, and pyrite. Due mainly to sharply increased production of sulfuric acid and ammonium sulfate, sulfur imports more than doubled from 40,412 tons in 1963 to 119,000 tons (\$5 million worth) in 1965. Canada, the United States and Mexico are the main suppliers. The duty on sulfur was reduced in 1965 from 25 to 10 percent.

Taiwan has already attained self-sufficiency in phosphatic fertilizers. Local output of calcium superphosphate and nitrophosphate (189,000 tons in 1965) rose to 204,000 tons in 1965 with the addition of new sulfuric acid plants in early 1965. Thus imports—10,000 tons of ammonium phosphate valued at \$600,000 in 1964—were no longer needed in 1965. However, since Taiwan has no phosphate rock de-



owned by American firms, such as this urea fertilizer plant of Mobil China Allied Chemical Industries.

posits, import of this raw material will increase as local output of super and nitrophosphate rises. The United States and Morocco are the main suppliers. About 123,000 tons (\$3.5 million) were imported in 1965.

Potassic fertilizers will continue to be imported, as Taiwan has no potash reserves. The import requirement in 1965 reached 90,000 tons and should go up to about 110,000 tons by 1968. Potassium sulfate and potassium chloride, the main imports, are supplied by the United States and Germany. Eventually, Taiwan may import only the potassium chloride and treat it with sulfuric acid to obtain potassium sulfate locally. Very little potash is imported in crude form.

The import duty on all fertilizers is 5 percent. Fertilizers may be imported only by the Taiwan Food Bureau and the Taiwan Sugar Corporation. Those Government agencies administer the complex rice-fertilizer barter mechanism by which fertilizer is distributed to the farmer in exchange for a certain portion of the annual rice crop.

United States firms engineered and designed most of the equipment being used in Taiwan's nine fertilizer plants. Hence, a great part of the machinery and parts came from the United States. Recently, however, the Japanese have made inroads in this field and, as future expansion and equipment renovation is undertaken, United States firms will find stiffer competition. Nevertheless, if they maintain close contact with TFC and KASC, in particular, excellent opportunities should arise for sales of electric furnaces, burners, ovens, boilers, kilns, air blowers, air liquefying machines, hydration machines, rectifiers, electrolytic hydrogen

cells, gas producers, gas reforming units, partial oxidation units, crystallizers, electrode manufacturing equipment, compressors, pumps, centrifuges, pipes, valves, jaw and cone crushers, granulators, and grinding machines.

### **AGRICULTURAL CHEMICALS**

Use of insecticides, fungicides, herbicides, plant regulators, soil stabilizers and other agricultural chemicals is essential in Taiwan, because the island's temperate climate and high humidity encourage pest infestation and plant disease. Among the more common pests are rice, corn, and vine borers; stem and leaf miners, leaf beetles, stem maggots, aphids, red spider mites, soybean beetles, potato weevils, and white and yellow moths. The main diseases include downy mildew, brown spot, rust, leaf blight blast, nematode white tip, virus yellow dwarf, sclerotium wilt, sclerotial sheath blight, and sclerotial culms rot.

Taiwan farmers regularly spray or dust their crops with chemical protectives, but they tend to play favorites and distrust new products, particularly locally produced ones. Thus, despite increasing local production of some items, imports are still preferred. Most often used are DDT, BHC, parathion, methyl parathion, malathion, sumithion, drivon, fumiron, diazinon, endrin, dieldrin, aldrin, pyrethrin, sevin, phosdrin, akatin, asozin, heptachlor, tuzet, manzet, lime sulfur, agrosan, granosan, lebaycid, folidol, dithane, kelthane, karathane, chloradane, dipterex, soilcin, metasystox, DDVP, PMA, EPN, PIN, and various organic mercuric compounds for field and seed sterilization and soil fungicization.

In most cases, the chemicals are imported in raw material form and processed locally. Nearly \$5 million worth were purchased in 1965. The United States and Japan are the main suppliers. United States sales, some of which had been financed under the AID program in the past, declined in 1965 in the face of stiffer competition. One factor working to the advantage of continued U.S. sales, however, is the farmer's reluctance to try something new, even though the Japanese image among Taiwan farmers is excellent.

The main competition will likely come from locally produced chemicals. A few are already produced in raw material form, and no imports of these are required or permitted. They include DDT, BHC, rotanone, bromodan, 2-4-D, and pentachlorophenol. Others, for example malathion, DDVP, and PMA raw materials are also produced locally, but total demand for them far exceeds current capacity. The only raw material producer is the Kaoshiung Agricultural Chemical Works. Import duties on both raw materials (except DDT and BHC) and processed agricultural chemicals were increased in 1965 from a flat 5 percent to between 5 and 25 percent.

The increased duty reflects the official belief that, given some protection, all the chemicals now being imported could be produced locally in a single, well-equipped plant. Since they are all made through organic synthesis, the same production equipment could be used even though ingredients would differ. Moreover, nearly all the basic chemical raw materials are also available, including natural gas; naphtha; aromatic solvents; hydrochloric, sulfuric, nitric, and acetic acid; formalin; ethyl alcohol; acetone; and sodium hydroxide, carbonate, and hydrosulfite. United States suppliers might well consider an investment or licensing agreement in this field, particularly if the increased duty and competition from other direct suppliers begin to affect their market there.

### **IRRIGATION EQUIPMENT**

Irrigation is vitally important in Taiwan where paddy rice is the dominant crop. Roughly 1.3 million acres, or 60 percent of the total cultivated area, are already irrigated. The source is mostly surface water from streams and reservoirs, but the rugged topography limits feasibility of building many more large scale reservoirs. Although several huge multipurpose projects are still under construction or in the planning stage, the main emphasis in the future will be more on ground water pumping, rotational irrigation, canal lining, and flood control. The entire water resources development program for the 1965-68 period will cost the Government and the 26 self-financed irrigation associations an estimated \$108 million. Specific projects will include the drilling of 365 additional wells and construction of 213,000 yards of new dikes and 312 new spur dikes.

Expansion of the irrigation system along the lines outlined should lead to excellent sales opportunities for drilling rigs, pumps and motors, transformers, accessories and spare parts, welded steel casings, and water measurement facilities. The Provincial Ground Water Development Bureau has responsibility for actual well drilling and would be the main customer for irrigation facilities. All procurement, however, would be handled through the Central Trust of China. Imports of water pumps alone amounted to \$550,000 in 1965. The United States and Japan are the main suppliers. The duty is 12½ percent.

### **FARM MACHINERY**

Mechanized farming is a fairly recent development in Taiwan. Most farming is still done by hand, using draft animals (mainly water buffalo) and basic implements. The pattern of small-size farm plots and hilly terrain, combined with overabundant farm labor, are the main obstacles to more widespread use of farm machinery. For example, efficient utilization of the most popular 4.5 hp. power tiller (roto tiller) requires an estimated minimum area of 17 acres. Even a tiller of less than 4.5 hp. will operate efficiently only on a farm of at least 6 acres in area. Few farms, except for the sugar cane land of the Taiwan Sugar Corporation (TSC), come close to 6 acres, let alone 17.

Nevertheless, the farmers' pressing need to increase yields, combined with a growing shortage of water buffalo, make the use of farm machinery more and more essential. There are presently about 400,000 buffalo on the island. At least 100,000 more could be used productively. A single 4.5 hp. power tiller could, of course, replace nearly five buffalo and could also provide power for other farm purposes. Thus, farmers are being encouraged to invest in farm machinery to increase productivity. By pooling their resources and removing the barriers between plots, the farmers are gradually moving in that direction. The number of power tillers in use on the farms increased from only 7 in 1954 to 3,200 in 1960 to about 13,500 in 1965. The Government estimates that at least 50,000 additional small power tillers will be bought in the next 5 years.

Until recently, all power tillers and accessories were imported. Now, nearly half are made locally at five plants, with the two factories using Japanese licenses accounting for most of the output. In 1965, local production was 2,500 tillers of various sizes, ranging from 3 to 10.5 hp. Also produced were attachments, such as single and double plows, pulverizing wheels, pudding wheels and rakes, planters, cultivators, rotors, ridgers, and grass mowers. Lacking, but greatly needed, are attachments for intertilling, weeding, harrowing, sprinkling, applying fertilizer, and other more sophisticated operations. These and more than half





**SHOWING THEM HOW:** Chinese farmers learn new techniques from agricultural specialists at one of the Republic of China's several farm demonstration centers.

the complete power tillers are still imported, mostly from Japan. Total imports of farm machinery amounted to \$409,000 in 1965, considerably below 1960 imports of \$1.2 million. The import duty is 10 percent.

The superior quality of United States farm tractors is generally recognized, but only the large plantation owners such as TSC can use them. The small-scale farmer can neither afford the big U.S. machines, nor can he put them to use effectively. Japanese machinery, on the other hand, is specially adapted to the needs of small-scale farms. Only by similar modification will United States farm machinery find a market on the island. A better marketing approach for United

States firms may be through a joint investment or licensing agreement with a local producer.

Other farm machinery, particularly centrifugal pumps, rice threshers, corn shellers, potato slicers, winnowers, sprayers, dusters and blowers, paddy weeders, draft plows and miscellaneous garden tools, are all produced locally and imports are negligible. In most cases, however, the engines are still being imported, since local quality is below par. The fourth Four Year Plan projects increases in farm equipment usage as follows: Power tillers increased from 11,000 to 20,000 sets by 1968; power sprayers from 1,900 to 3,800 sets; and farm pumps from 27,000 to 39,500 sets.



# Selling to the Consumer Market

Taiwan has all the ingredients for a large and growing consumer market—rapid population growth, rising per capita incomes, and a desire for a more comfortable life. However, if consumer tastes and preferences are discounted, this market can be supplied locally to a large extent. Most of the daily necessities and many of the household appliances, leisure time products, cosmetics, and fashion wants are produced in local factories. Taiwan consumers, like their counterparts everywhere, do not necessarily prefer the local products to imported ones, but the Government feels generally that (1) excessive consumption is a luxury at this stage of Taiwan's development and (2) that which must be consumed should benefit local industries and should not be a drain on foreign exchange reserves. Accordingly, most imports of consumer goods are tightly controlled, some to protect local industries and some for foreign exchange reasons.

Thus, consumer tastes and preferences are given little opportunity to influence sources of supply, and consumer goods imports are therefore somewhat limited. In 1965, they reached a peak of \$97 million (17 percent of total), or only about \$8 per capita for the entire year. Nearly 80 percent of these imports (\$77 million worth) were of an essential nature, including wheat, soybean, milk, and medicines for general subsistence. Less essential and luxury consumer imports amounted only to \$20 million in 1965 or just \$1.60 per capita.

This restrictive outlook, however, may not be a

protracted feature of the consumer goods import market. In the first place, the island's export sector has done so well in the last several years that foreign exchange reserves are comfortably in surplus—\$297 million as of June 1966, or sufficient for about 7 months' imports. Indeed, officials are now reasonably confident that the once chronic foreign exchange shortage is over, and that continuing annual surpluses are feasible. Given this prospect, the Government has already begun some relaxation of import controls geared to foreign exchange considerations; and less essential consumer goods which are not produced adequately in Taiwan are being gradually decontrolled.

Secondly, the Government's protective system is infant industry oriented and expressly nonpermanent. Theoretically, local producers who benefit from import controls have 3 years during which to bring their products up to a competitive level in terms of price and quality. If this is not done, the import controls are supposed to be removed. In practice, decontrol has been slow so far. Nevertheless, progress is being made toward removing import controls on those consumer items which are also locally produced. The corollary to this, however, is that any new consumer products developed in Taiwan are themselves eligible for protection. Thus, while protective controls on some imports may be lowered, new controls may be imposed on other imports. On balance, however, the trend regarding quantitative restrictions appears favorable to foreign suppliers.

Although the quantitative controls are being relaxed gradually, high tariffs on most consumer goods will

**FOR MADAME:** handicrafts on display at the Taiwan Handicraft Promotion Center.

probably remain for some time. Typical duties range from 50 to 80 percent on prepared foods and provisions; 55 to 90 percent on clothing, apparel, and textile made-up articles; 100 percent on tobacco and alcoholic beverages; 30 to 50 percent on household appliances; 20 to 30 percent on photographic apparatus; 25 to 50 percent on paperware; 40 to 70 percent on cutlery, utensils, and glassware; 120 percent on cosmetics and toiletries; 80 percent on jewelry; 35 percent on sports equipment; 60 percent on toys and games; and 110 percent on musical instruments.

### **DEMAND TRENDS AND FACTORS**

Assuming in the long run that foreign suppliers will have increasing access to the consumer market, some analysis of demand trends and factors is warranted. The main factors affecting the overall consumer market are population growth, income growth and distribution, and expenditure levels and patterns; those influencing the source of supply (aside from import controls) are consumer attitudes, preferences, and buying habits.

Taiwan's total population in 1965 reached 12.6 million, roughly equivalent to the population of Australia, Belgium, the Netherlands, Sweden, Greece, Portugal, Colombia, or Venezuela, and not far below that of Canada. With the island's population growing by 3 percent a year, it should total about 13.9 million by 1968. The more people, the greater the demand for essential items—food, clothing, medicines—irrespective of income. Since Taiwan lacks some of these subsistence goods, supply will depend on increased imports.

Taiwan's per capita income rose to \$174 in 1965, lower than the level in Japan (over \$500) and Malaysia (\$225), but higher than in all other countries in the Asian area, including the Philippines, Thailand, Korea, Indonesia, India, Burma, Ceylon, and Pakistan. The per capita income growth rate in real terms also compares favorably with countries in the region. It increased by 20 percent from 1960 to 1964 and by about 4 percent from 1964 to 1965. By 1968, Government officials expect per capita income to reach about \$196, based on a projected annual average increase in real terms of 4.1 percent.

Rising per capita income will have varying effects on consumer demands. First of all, of course, greater income will raise Taiwan's overall level of demand for consumer goods. Secondly, the more income people receive, the less their tendency to spend it on basic necessities. Thus, consumer demands will be channeled relatively more toward nonessential items as real incomes rise. Thirdly, higher income people also tend to develop a desire for imported goods, as they assume the mode of living prevalent in advanced countries. Thus, the greater demand for nonessential items will seek satisfaction from imports to a growing degree. In

short, while the import demand for basic necessities will increase steadily by virtue of population growth, the import demand for less essential items should increase even faster by virtue of income expansion.

During the 6-year period 1960-65, imports of essential consumer goods rose by 50 percent from about \$49 million to \$73 million while imports of less essential items increased by 23 percent from about \$13 million to \$16 million. The United States was the main source of the former under P. L. 480 and other aid programs, while the United States, Japan, and to some extent Hong Kong, Italy, Switzerland, and Germany shared the market for less essential consumer goods.

### **PURCHASING POWER**

Total national income in 1965 was \$2,260 million. Of this amount, about \$2,079 million was actually received by households and the remainder was accounted for by savings and direct taxes of corporations and by Government income. Considering only household income, the average amount per capita available for personal consumption was about \$165 in 1965.

Income distribution is uneven. Some consumers are extremely wealthy, particularly some of the mainland evacuees who were able to bring all their assets to the island in 1949 and many of the former Taiwanese landowners who were given shares in industry as payment for the redistribution of their land during the 1950-54 land reform program. On the other hand, a large number of persons are receiving well below the average income, particularly farm people and unskilled industrial workers.

Government surveys show that nearly 3.8 million persons out of a total population of 12.6 million were income earners in 1965. More than 4.6 million others were dependent children under 12 years of age, and another 3.5 million were dependent students and housewives. The remainder—735,000—were either temporarily out of work, unemployed, or aged and infirm. The total number of households supported by income earners was about 2.3 million in 1965, or an average of about 6.8 members per farm household and 4.9 persons per industrial and professional household, including the income earner.

Of the 3.8 million or so income earners in 1965, some 2 million were farmers and related agricultural workers who directly supported 847,200 farm households and a total agricultural population of more than 5.7 million persons. Income received by farm households in 1965 reached about \$495 million, or about \$584 per household and \$86 per person.

Another 1.5 million persons were salaried employees in the fields of mining, manufacturing, construction, transport, communications, warehousing, commerce, utilities, and services. Their aggregate compensation in the form of wages, salaries, and social security benefits amounted to about \$1,024 million in

1965, or \$695 per employee. Assuming that about 81 percent of these employees were 1 of the 4.9 members in a household, the number of households and persons supported by the salaried group would have approximated 1.2 million and 5.8 million, respectively. This would have given each household about \$857 and each person \$175 in 1965. In many of these households there are 2 or more income earners, but data are not available to reflect this condition accurately.

The other 266,000 or so income earners were mainly in the more lucrative occupations—managers, technicians, professionals, industrialists, and businessmen. They supported about 215,500 households and 1 million persons in 1965. Assuming this group received all the remaining household income (\$533 million), then each income earner earned an average of \$2,004 in 1965 and each household and person received \$2,474 and \$506, respectively.

### **NATURE AND RATE OF SPENDING**

On the expenditure side, the total spent on private consumption in 1965 reached about \$1,760 million (\$140 per capita), or nearly 80 percent of total national income and 65 percent of GNP. The annual real increase in private consumption spending has averaged about 6.8 percent since 1960. If this rate continues, Taiwan consumers will spend \$2.1 billion in 1968, or an average of \$153 per capita (in constant 1964 prices). Projecting on a different basis, if the ratios of expenditure to national income and GNP remain the same, then total expenditure in 1968 would likewise be about \$2.1 billion (assuming real national income and GNP increase by 7 percent annually to \$2,775 million and \$3,373 million, respectively in 1968 and the propensity to consume declines somewhat).

Available official data indicate that of total expenditures, Taiwan consumers spend 52.0 percent on food and beverages, 8.07 percent on medicines and health care, 5.93 percent on clothing and other personal effects, 5.82 percent on furniture and household equipment, 4.75 percent on tobacco, and 2.53 percent on recreation and entertainment. The remainder is for noncommodity expenses, including transportation and communications, 11.75 percent; utilities, 7.01 percent; and household maintenance, 2.03 percent. Considering only commodity expenditures, the trend over the last 5 years has been sharply upward for medicines, drugs, and other health expenses—20 percent a year on the average; tobacco products, up 18 percent a year; and household articles (furniture, decorations, cooking utensils, toilet articles, electrical appliances, sewing machines, musical instruments, clocks, bicycles), up 14 percent a year. Spending on food and beverages; recreation and entertainment (reading matter, movies, sports, records, toys); and clothing and personal effects also increased but at relatively slower rates—11, 8, and 4 percent a year, respectively.

If this pace continues, Taiwan consumers in 1968 would be spending about \$1,090 million on food and beverages, \$100 million on tobacco, \$124 million on clothing and personal effects, \$122 million on household articles, \$169 million on health care, and \$53 million on recreation and entertainment.

### **WHO THE BUYERS ARE**

As consumers, the people in Taiwan, be they farmers, businessmen, professionals, or any other classification, are susceptible to sales presentations that stress eye appeal, styling, status, and beautification. With limited income, however, also comes an emphasis on utility and economy; hard bargaining is second nature to them. For those who can afford it, and even for those who sacrifice in order to get it, prestige brand consumer merchandise is highly prized. In most cases, this means foreign, and particularly, American brand products. This preference augurs well for United States and other foreign suppliers of consumer goods once import controls are relaxed. American products bearing labels in Chinese characters should show clearly that the product is made in the United States. Otherwise the product may be confused with a local manufacture and sell at a reduced price.

In general, except in the few cases where Chinese customs, beliefs, and predilections dictate otherwise, a sales presentation geared for the United States market is suitable for Taiwan. In order to protect against the possibility of offending Taiwan customers, the supplier should seek the advice of his local representative wherever possible and be responsive to suggestions on color, design, packaging, and labeling. (For more details on advertising and labeling, see Chapter 2).

Following are other general characteristics of the population which, to some degree, influence consumer buying habits and preferences in Taiwan and which condition the nature of effective marketing.

1. Total population at the end of 1965 was 12,628,000 (excluding military personnel). The population is growing by 3 percent a year and by 1968 should reach 13.9 million. There were 2.3 million households in Taiwan in 1965 averaging about 6.6 members each in rural areas and about 5.8 members each in urban areas. There are more males than females—6,491,000 to 6,137,000 in 1965. About 65 percent of the population above 14 years of age are married—4.4 million couples in 1965. About 90,000 couples get married each year.

2. Young people form a dominant segment of the population. Nearly 46 percent (5.7 million persons) of the total population were under 15 years of age in 1965. While the younger set is an important consuming group, it has little or no purchasing power of its own. Neither do the 4.5 (568,000 persons in 1965) of the population above the age of 60. Cash for consumer

spending is held mainly by the 50 percent (6.4 million persons) between the ages of 15 and 60 who buy for themselves and their dependents.

3. Though most of the people still live in rural areas, urbanization is steadily increasing. About 30 percent (3.7 million persons) of the total population live in 11 urban cities; a substantial majority of 2.9 million or almost 24 percent live in 5 principal cities of over 250,000 persons each. The other 6 percent (746,000) live in 6 other urban cities averaging less than 125,000 persons each. Another 29 percent (3.6 million persons) live in small towns, while 41 percent (5.1 million persons) still populate the countryside. Nearly all the country dwellers and some of the town people are farmers. Farm population in 1965 was more than 5.6 million persons, or 46 percent of the total. Between 130,000 and 150,000 people move each year from the countryside to the big cities. The main urban population centers are Taipei (1.1 million), Kaohsiung (580,000), Tainan (393,000), Taichung (355,000), Keelung (273,300), and Yangminshan (140,000)

Average expenditures per household in urban areas tend to exceed those in rural areas by about 3 percent. On a per capita basis, the gap widens to about 17 percent, reflecting the lower ratio of persons per household in urban areas. In general, expenditures in urban areas are high from March through October and relatively low over the winter months. In rural areas, expenditures are relatively low during the first half of the year and higher during the second half.

4. Ethnically, 80 percent of the population are Taiwan-born Chinese ("Taiwanese"), 18 percent are Mainland-born Chinese ("Mainlanders"), and 2 percent are aborigines of Malay stock. The Taiwanese are mostly farmers or businessmen, while the Mainlanders are found mostly in the professions, technical fields, and Government services and are concentrated in the large urban centers. Aborigines play little or no role in the economy. The chief distinction between the Taiwanese and Mainlanders as consumers is that the latter are generally more familiar with Western ideas and products. The Taiwanese tend to be more traditionalist in outlook but do not resist innovations. They also tend to be Japanese oriented.

5. The official language (or dialect) is Mandarin, spoken chiefly by the Mainlanders and by most young persons under 25. About 5 million persons above the age of 4 can speak it, and it is spoken mostly in urban areas. Most Taiwanese, however, speak the Minnan dialect, which they brought from Fukien Province whence they emigrated in past centuries. Some Taiwanese who originally came from Kwangtung Province speak the Hakka dialect. Perhaps 9 million persons altogether speak the Minnan dialect and 2 million the Hakka dialect. The former is spoken largely in rural areas all along the western coast of the island,

while Hakka is dominant in the rural northwest and along the eastern coast. Japanese, a carryover from 50 years of Japanese occupation (1895-1945), is understood by adult Taiwanese but is not often spoken. English is spoken by about 1-2 percent (100,000 to 200,000 persons) of the population and in the larger cities, while another 4 percent have a rudimentary knowledge. The speakers of English include mostly uppergrade students, Government officials, and some businessmen.

6. Confucianism, with its emphasis on moral values and human dignity, is the dominant societal influence in Taiwan. It is not a religion but more a code of ethics or way of life and does not preclude worship in the organized religions. Among the latter, 6 to 8 million Chinese on the Island are Buddhists, and another 1 or 2 million are Taoists. There are also about 250,000 Catholics, 210,000 Protestants, and 40,000 Moslems.

### **PRODUCTS OFFERING BEST POTENTIAL**

Sales prospects for specific consumer goods will depend largely on (1) whether in the official view the product is needed in Taiwan and (2) whether local production of it is inadequate in terms of supply and quality. These factors largely determine whether import restrictions are warranted for the particular product, and whether the restriction should be imposed for foreign exchange or industrial protection. The best prospects in both the short and long run are for those consumer goods which are not produced locally in adequate supply or quality and which the Government feels should be imported. Within this group, items which are not import controlled should enjoy sharply increasing sales; those which are controlled should also increase, but at an uneven pace, in response to current local supply conditions. Following are consumer goods falling within this overall category and listed according to the extent of import. Items marked with an asterisk are presently controlled (see tables in Appendix C for import values):

- Food products, including rice, corn, soybean, other beans, edible starch, powdered milk, wheat\*, peanut\*, and soybean oil\*—**imports heavy.**

- Bran, currants and raisins, copra, evaporated milk and cream, butter, yeast, barley\*, buckwheat and millet\*, peanut oil\*, other oils and fats of seeds, nuts and kernels\*, fish\*, apples\*, lard\*, coconut oil, and other edible oils and fats\*—**imports moderate.**

- Pears, potatoes, coffee, dried and salted meat, cinnamon, cloves, pepper, and live cattle for food\*—**imports small.**

- Leisure-time products, including photographic film, plates and paper, unexposed cinematographic film, cameras and other photographic apparatus, cinematographic apparatus, tape recorders, pianos,



**MUSHROOMING EXPORTS:** some 1.5 million cases of them, as a matter of fact, are exported per year. Above, mushrooms are cleaned and trimmed before being canned.

newspapers and periodicals, and books—**imports moderate.**

- Other products, including spectacles and binoculars, coated and/or enameled paper, cellophane and other transparent paper, miscellaneous paperware, propelling pencils, fountain pens and penholders, alarm and other clocks, watches, document, bond and drawing paper\*, office requisites\* and woolen blankets\*—**imports moderate.**

A second category offering good sales potential includes those consumer goods which are not at all restricted, but for which consumer import demand has not yet crystallized. Although imports are presently small, demand could presumably be stimulated through effective advertising and marketing programs. Consumer goods in this category include the following:

- Food products, including bean flour, rolled oats, macaroni, cornflakes, malted milk, garlic, onions, rhubarb, coconut, corned beef, fish oil, cardamon, fennel seeds, aniseed, safflower, saffron, senna leaves, catsup, margarine, grapes, olives, preserved cherry—**imports small.**

- Other products, including charts and maps, photographic image projectors, ultra-violet lampware, chinaware, mirrors, candles, wrist watch hands of manmade fiber, woolen and linen neckties, sponges, toothbrushes, toothpaste, door checkers, and plastic plugs, receptacles, and sockets—**imports small.**

The prospects for increased sales of all other consumer goods appear rather dim for the immediate future. These products include the tightly restricted items, as well as those locally produced items which are generally preferred to imported ones, whether restricted or not. Within this overall group greater potential exists for those items restricted for foreign exchange reasons, because the advances made in the last 2 years toward balancing Taiwan's international payments may well enable the Government to relax some of those controls. Following is a list of items which appear mainly to be restricted for foreign exchange purposes, based on the fact that local production is limited or of markedly inferior quality.

- Food products\*, including honey, dates, chocolate, cocoa, chestnuts, walnuts, fresh meats other

than pork, live sheep and lamb for food, meat extracts, dried and salted fish, caviar, prepared and preserved eggs, nutmeg, and mustard seed—**imports small.**

- Other products\*, including woolen carpets, electric air conditioners and phonographs—**imports moderate.**

- Whisky, brandy, cognac, champagne, wine, vermouth, gin, rum and liqueurs, toys and games, sports ammunition, cosmetics and perfumery, toilet articles, jewelry, furs, hair manufactures, feathers for decorative purposes, crystalware, and air filters, purifiers and sterilizers—**imports small.**

The large number of consumer items restricted mainly for protective purposes (listed below) are not likely to be decontrolled in the near future. Some controls may be removed from time to time as the 3-year limits for the various industries expire, provided this criterion is strictly enforced. On balance, though, opportunities for direct sales of these items are very slight. As an alternative to direct sales, United States suppliers might consider investing in, or licensing, a local plant to manufacture the product in Taiwan. Many of the items included in this category lend themselves to a joint venture or licensing arrangement, particularly if the product is exportable from Taiwan.

- Household articles\*, including electric refrigerators, electric and fluorescent lampware, metal furniture, and radio and TV sets—**imports moderate.**

- Heating appliances; household utensils; cutlery; electric cookery, fans, flashlights, irons, toasters, blankets, and other household electric appliances; earthenware, potteryware, and stoneware for household and sanitary use; enameled ironware for household and sanitary use; wooden furniture; bed and table covers of manmade fiber; toilet paper; paper napkins and towels; and soap and prepared detergents—**imports small.**

- Other products\*, including fresh pork, bacon, and ham; live swine and poultry for food; all clothing and apparel of cotton, wool, manmade fiber, rubber, leather, and plastic; cigarettes, cigars, and tobacconist sundries; ale, beer, and fruit liquors; and writing and printing paper—**imports small.**

Consumer goods offering the least potential in both the short and long run are those which are now being produced locally in large quantities with surpluses available for export. Although all of these, as listed below, are still controlled for foreign exchange reasons, even the removal of controls would not be apt to benefit imports measurably since the local product is abundant, inexpensive, and of good quality.

- Food products\*, including prunes, lemons, bananas, lichees, lungnans, canned pineapple, canned mushroom, jams and jellies, fish liver oil,

MSG, tea, fresh fish, dried and smoked fish, sharks fins, fish roe, fresh eggs, salt, and sugar—**no imports.**

- Wheat flour, prepared cereals, oranges, fruit syrups and juices, asparagus, fresh mushrooms, bamboo shoots, soya sauce, sardines, fresh shrimp, prawns, lobster and crab, oysters, clams and mussels, miscellaneous flavoring essences and extracts, miscellaneous prepared vegetables, and miscellaneous fresh, dried, preserved, and canned fruits—**imports small.**

- Clothing and apparel\*, including all clothing of jute, flax, ramie, and silk, all embroidered items and umbrellas—**no imports.**

- Other products\*, including duck and goose feathers, feather manufactures, and bone manufactures—**no imports.**

- Straw manufactures, bamboo and rattan manufactures, lacquerware, luggage, all cotton articles, and buttons—**imports small.**

### ***U.S. GOODS IN DEMAND***

Within the framework of tight import controls on many consumer goods, there are nevertheless a number of specific consumer items which American suppliers have been able to sell. Primary foods have accounted for most of the United States sales in this category, but some manufactured consumer products also have gained entry and have found increasing acceptance. In the latter case, the sales volume is still rather moderate, but the potential is great enough to warrant further investigation.

The following United States consumer goods, grouped according to their level of imports in 1965, are believed to have the best prospects for future sales growth. During the 5-year period 1960-65, their sales increased at a faster rate than competitive products from other sources, and consequently their market share has expanded. Moreover, the same demand factors which occasioned their better-than-average sales growth until now are still present and are likely to continue over the next several years. (The United States share of the market in 1965 is given in parentheses. See tables in Appendix for 1965 import values).

#### **Best U.S. Sales Prospects**

- United States sales over \$1 million in 1965: Soybeans (100), wheat (87), corn (54).

- United States sales between \$100,000 and \$1 million in 1965: Currants and raisins (96), plastic manufactures (35), photographic plates, paper, and film (21), sedan cars (41).

- United States sales between \$10,000 and \$100,000 in 1965: Coffee (49), alcoholic beverages (17), clothing and apparel (85), serums and vaccines (48), soaps and detergents (71), newspapers and periodicals (39), fountain pens and mechanical



pencils (15), inks (25), eye glasses and binoculars (27), electric air conditioners and parts (65).

A second category of United States consumer goods includes those whose sales to Taiwan have increased, but not as rapidly as sales of competitive products by other suppliers. Thus, while these United States products have increased in overall sales value, their share of the market has declined. Since Taiwan import demand for these products is still increasing, the fall in the United States market share is mainly the result of intensified competition from third country suppliers. More promotional effort is clearly needed if United States products in this category are to benefit to a greater degree in Taiwan's population growth and the improvement in living standards.

### **Good U.S. Prospects, Greater Promotion Needed**

- United States sales between \$100,000 and \$500,000 in 1965: Live animals for food (36), yeast (65), powdered milk (12), movie film, unexposed (38), movie film, developed (18).

- United States sales between \$10,000 and \$100,000 in 1965: Vitamins (9), paperware (15), typewriters (30), image projectors (34), tape recorders and record players (23), lamps and lampware (54), electric refrigerators (53), household electrical fixtures and fittings (17), household plumbing and sanitary fixtures (70).

The following United States consumer goods have generally declined in sales volume in the last few years. For most of them, Taiwan's overall imports have increased, while only the amount supplied by the United States has decreased. Here the main factor is more extensive competition from third country suppliers. United States sales in this latter category (asterisked) could probably be stimulated by a more aggressive competitive effort.

### **U.S. Sales Declining, Further Decreases Possible**

- United States sales between \$100,000 and \$500,000 in 1965: Bean oil (99), antibiotics (21), radio and TV receivers (5).

- United States sales between \$10,000 and \$100,000 in 1965: Nonelectric appliances (30)\*, water meters (10)\*, electricity meters (26)\*, station wagons (20)\*.

Following are consumer goods imported into Taiwan which are not supplied by the United States to any significant extent. United States sales of these items in 1965 either were all valued under \$10,000 or their share of the market was under 10 percent in that year. In some cases, Taiwan is a very limited importer of these items from any source, mainly because of import controls. (Total imports of asterisked items were valued below \$50,000 in 1965). In other cases the United States does not produce the items and/or does not export them. In still other cases,

where there is both an import demand in Taiwan and a supply capability in the United States, meager United States sales are most likely due to a competitive problem, or lack of effort, or lack of interest. On balance, however, prospects for increased United States sales of the items listed below are rather limited and are not likely to improve greatly in the long run, unless import controls are substantially relaxed.

### **U.S. Sales Under \$10,000 or Accounting for Less than 10% of the Market in 1965:**

Rice; barley; bran; edible starch; malt; beans (except soybeans); fresh, dried, and preserved meats\*; fresh, dried, and preserved fish; evaporated milk and cream; butter; other dairy products (except powdered milk)\*; fresh, dried, and preserved fruits (except currants and raisins); canned and frozen foods; sugar; salt; spices; cocoa; nonalcoholic beverages\*; sulfa drugs; plasma; ginseng; crude medicinal substances; cigarettes and tobacco manufactures\*; dressed and undressed skins\*; leatherware\*; bamboo, rattan, and coir manufactures; charts and maps\*; books; furniture\*; clocks; watches; earthenware, potteryware, and stoneware\*; chinaware\*; cutlery; utensils\*; mirrors\*; linoleum and floor coverings\*; wallpaper; decorative and ornamental materials; luggage\*; cosmetics and toiletries\*; jewelry\*; musical instruments; sporting requisites; toys and games; photo cameras, lenses, and parts; cine projection apparatus; bicycles; motorcycles and scooters.

### **SELLING SPECIFIC CONSUMER GOODS**

Following are general descriptions of markets for various categories of consumer goods. Detailed analysis is not given because of the widespread imposition of import controls which severely limit most consumer import markets and which are not likely to be eased for at least several years.

#### ***Food and Beverages***

Aggregate food consumption in 1965 reached 5 million tons and is growing at about 4.5 percent a year. By 1970, it could reach 5.8 million tons, half of which would be rice and vegetables. Daily per capita caloric intake is about 2,400 calories, very high for Asia. Roughly 63 percent of total calories are obtained from grains; 5 percent from meat, fish, poultry and eggs; and 13 percent from roots and tubers. Most of the foods which make up the local diet are grown locally. Only about 12 percent are imported.

Rice and sweet potatoes are the main staples for low income families, particularly in the rural areas. Rice is imported from time to time to augment local supplies. Thailand is the main supplier. Abundant fruits, nuts, and vegetables are available all year round for everyone. (Imports amounted to \$1.2 million in

1965, mainly fresh apples and pears from Japan and Korea and currants and raisins from the United States.) Pork, beef, poultry, fish, milk, and eggs are the main sources of animal protein, but are relatively expensive. Moreover, distribution in fresh form is poor, and canning is not yet well developed. Per capita animal protein intake is only about 65 grams per day. Except for milk, however, imports are restricted and kept to a minimum. Milk imports in powdered form, valued at \$4.6 million in 1965, were supplied chiefly by Australia, Holland, Japan, and the United States. Imports of meat, fish, and dairy products other than milk amounted to \$1.7 million in 1965 and came largely from Asian suppliers.

Vegetable protein foods are available to some extent in the form of soybeans and other beans, peas, peanuts, and wheat, corn, and other grains, but heavy imports of some are required. Import values in 1965 reached \$19.3 million for soybeans, \$2 million for other beans, \$4.1 million for corn, \$27.9 million for wheat, and \$1 million for other grains and flour. Of these, the United States supplied all of the soybean,

most of the wheat, and half of the corn, while suppliers in Asia and Latin America shared the other markets.

Among other foods, Taiwan imported about \$674,000 worth of edible oils and fats (nearly all from the United States), \$411,000 worth of miscellaneous foodstuffs (53 percent from the United States), and \$317,000 worth of spices (all from Asia). Additional sales should develop as import controls and duties are liberalized. United States suppliers should keep close watch on the import control situation, and move quickly when new items are decontrolled.

Tea is the traditional Chinese drink and is consumed almost to the exclusion of other beverages in the cool seasons. All the tea is grown locally. Coffee, though no longer a restricted import, is not in much demand. During the long hot spells from May to September, cold soft drinks are also popular. Alcoholic beverage consumption is fairly moderate, about 2½ gallons per person per year on the average. Rice and fruit-base wines are most popular, followed by beer. Soft drinks, wines, and beer are produced local-

**LOCAL PRODUCTION:** Taiwan is rapidly becoming self-sufficient in most of the popular consumer items. This modern machinery is in a pharmaceutical factory owned by the Cyanimid Taiwan Corp., a joint venture between the American Cyanimid Co., and the Taiwan Sugar Corp.



ly, and imports are not permitted. Were they allowed in, a ready market would almost certainly materialize for imported soft drinks, but not so readily for beer and wine. Western type hard liquors and dry red and white wines are not produced locally in recognizable form, but are nevertheless proscribed imports. The high cost of such liquors would in any case narrow the demand to a very small consumer group, even if imports were permitted. Total alcoholic beverage imports in 1965 were valued at only \$135,000, and came principally from the United Kingdom, Germany, and France.

### ***Tobacco Products***

Chinese men are heavy cigarette smokers. Even though very few women smoke total sales are running above 110,000 cases a month (10,000 cigarettes a case), and consumption is increasing by 8 percent a year. Other tobacco products, such as cigars and chewing tobacco, are not very popular. Nonfilter cigarettes are smoked for the most part, but demand for filter cigarettes is rising by 100 percent a year. Only about 2,000 to 3,000 cases of menthol cigarettes are sold a month. Cigarettes are produced locally in a wide enough price range to meet all pocketbooks—from 8 cents a pack for the cheapest nonfilter brand to 30 cents for the most expensive filter brand. United States leaf tobacco is used only in the 14 cents and above cigarettes; all production has thus far been of the untoasted variety. However, the sole producer (Taiwan Tobacco and Wine Monopoly Bureau—TTWMB) plans to come out with U.S.-type (toasted) cigarettes in 1967. If the experience in Hong Kong holds true for Taiwan, American-type cigarettes would capture about 75 percent of the total market within 5-10 years. Thus, if imports, now tightly restricted, are liberalized by that time, American brand cigarettes should find ready acceptance in the market.

### ***Wearing Apparel***

Taiwan's warm sticky climate that prevails during much of the year and the generally low incomes of the population are the chief factors influencing clothing consumption. Cotton and rayon apparel predominate. Manmade blends with cotton or wool appeal more to the middle and upper classes. Very little demand exists as yet for high fashions. In summer, the usual attire for manual laborers and farmers is T-shirts and shorts or slacks made from coarse cotton fabrics. For 7 months of the year, businessmen and the wealthier people wear lightweight, washable materials, including cotton cords, tropical worsteds, and manmade blends with cotton, wool, or worsted fabrics. Women usually wear summer cottons and other lightweight washable dresses during the hot May to September months. Moderately heavy wool dresses are needed for the

cooler seasons. Children wear shorts, T-shirts, and blouses during the summer and slacks or skirts, blouses, and sweaters in winter.

Footwear is simple and cheap, mainly rubber, plastic, or leather sandals. The well-to-do wear leather shoes but because the domestically made product is of poor quality and uncomfortable, they also resort to sandals for informal wear. In any case, nearly all the clothing and footwear worn locally is produced in Taiwan and imports are severely restricted. Total imports in 1965 amounted to only \$30,000, supplied mostly by the United States.

### ***Beauty Aids***

The beautification complex which is so prominent in the developed countries has not yet penetrated Taiwan to a marked degree. This is mainly due to a relative infrequency of "dress-up" occasions for much of the female population, the fine natural complexions of Chinese women which do not require much artificial enhancement; and the poor quality of abundant local products which discourages their use. This is not to say that Chinese women are not conscious of their appearance. For example, girls working in the fields all day take great pains to cover themselves from head to foot to protect their complexions from the sun and intense heat. Eventually, as incomes rise and the Chinese women become familiar with the artifices used by women elsewhere, they will no doubt follow suit. Japan and Hong Kong are good examples of this trend. Some United States cosmetics firms have sponsored demonstration programs in Taipei to hasten the apparently inevitable process, and one United States firm has licensed local production. If import controls are ever lifted, which does not appear likely for some time, the market could be substantial, at least among urban dwellers. Total imports of cosmetics, perfumes, toiletries, jewelry, and other beauty aids in 1965 were valued at only \$14,000. The import duty is 120 percent.

### ***Household Equipment and Supplies***

Household equipment in the average home in Taiwan is simple and sparse. The space available in household units is too small to accommodate the myriad appliances so widely used in American homes. More importantly, income levels are not yet high enough to permit anything more than basic essentials. For example, to save the expense of refrigeration, housewives go to market each day. Food is cooked on small coal or woodburning stoves; rooms are cooled with small electric fans; furniture is cheap and minimal, as are cutlery and utensils.

On the other hand, virtually every person has a wristwatch and bicycle; every home has a clock; every other home has a radio; and a small but in-

creasing number of families are buying TV sets, about 1,500 a month. As incomes rise, the biggest demand will probably be for refrigerators, air-conditioners, and radio and TV sets. In general, electrical rather than gas appliances are used. Gas has not yet become a significant household fuel in Taiwan, although it may become more commonplace as natural gas development expands.

Nearly all the household articles now used in Taiwan are locally produced. Except for those made under foreign licensing arrangements, quality and design are poor. Imports are restricted, but some come in anyway, mainly for the use of hotels, restaurants, and other tourist establishments. Except for radios, watches, and clocks, imports for individual consumption are tightly restricted. Radio imports are believed to be in excess of \$1 million a year. Watch and clock imports are also substantial—about \$1.9 million in 1965—particularly since no local production exists. Imports of all other household goods, including appliances, furniture, cutlery, utensils, and decorative articles, amounted to only \$1.3 million in 1965. The most effective way to reach this market, given the extensive import controls, appears to be investment in or licensing of a local manufacturing operation by a U.S. firm, and supply components to it as part of the agreement.

### *Leisure Goods*

Leisure time and facilities are not lacking in Taiwan. Customers jam the movie houses, bars, parks, and sports arenas all year round. The Chinese are great sports lovers, particularly of the popular Western sports—soccer, baseball, basketball, golf, and tennis—as well as swimming and traditional track and field events. There are basketball and tennis courts, swimming pools, cinder tracks, and baseball diamonds throughout the island, and a few scattered golf courses near the big cities. Taiwan produces all of its own sports equipment except baseballs, tennis balls, golf balls, and bowling balls, which are imported. Local quality, however, is poor and foreign brands will find increasing acceptance as incomes rise. Total imports of sports equipment reached \$72,000

in 1965. Imports are not restricted; the duty is 35 percent.

Moviegoing is the favorite family pastime in Taiwan, particularly in urban areas. More than 500 feature films were shown in some 740 theatres on the island in 1965. Foreign films, mainly American ones, are preferred, even though theater admission prices for these are higher.

The Government reduced the import quota on foreign films from 420 in 1960-61 to 334 in 1965-66. Of the latter number, 198 were American films. During 1965-68, roughly \$8.4 million worth of movie films will be imported. Admission taxes on foreign films are 50 percent higher than the tax on local films. The import duty on foreign films is 50 percent.

Photography is a booming business in Taiwan. The island is immensely scenic (the Portuguese name it "Ilha Formosa"—beautiful island); more of the local population can afford the hobby; and an increasing number of foreign tourists (most of whom are camera bugs) are flocking in each year. Neither cameras, film, nor other photographic accessories are produced locally. Since the Government is actively promoting the tourism industry, it has not restricted imports of photographic equipment. Thus, imports are fairly substantial, rising from \$744,000 in 1960 to over \$1.4 million in 1965. Japan and the United States are the principal suppliers. Import duty on cameras and lenses is 30 percent; on projectors, 25 percent; and on photographic plates, paper, and film, 50 percent.

The toy and game market is quite large because of the heavy preponderance of children in the population. Taiwan's local industry—several dozen factories—turns out more than enough toys and dolls for the local market, but they lack variety and imagination and are poor in quality. Mechanical toys are not yet produced. Since children are the most impressionable consumers, a large market for imported American toys could easily be developed if there were no import restrictions. However, the present tight lid on imports is not likely to be removed for some time. United States suppliers might consider investments in the local manufacture as an alternative to direct sales.

# Notes for Business Travelers

## **Entry Formalities**

All visitors to Taiwan must hold valid national passports and visas obtained from any Chinese diplomatic or consular mission abroad. (Names and addresses of Chinese missions in the United States are listed in Appendix D). Three kinds of visas are obtainable—a transit visa good for 2 weeks only; a tourist visa, valid for 1 month but extendable for another month; or a regular entry visa, good for a longer stay. The transit and tourist visas expire 3 months from the date of issue and are for a single entry only. The visa fee of \$2.50 is waived for United States citizens.

## **Customs Regulations and Currency**

Articles for personal use, if declared and certified as such, may be brought into Taiwan duty free, whether accompanying the traveler or shipped to him within 6 months after entry. Gift items are dutiable, as are samples valued above \$25, even though not for sale. Foreign currency holdings must be declared, but any amount may be brought in and is convertible. Current exchange rate is 40 New Taiwan dollars to US \$1. Travelers checks and bank drafts need not be declared.

## **Health Regulations and Precautions**

All persons arriving in Taiwan must possess valid International Certificates of Vaccination against smallpox. Also, even though these measures are not required, Americans should strongly consider precautionary immunization against typhus, typhoid, cholera, malaria, diphtheria, polio, and gastrointestinal diseases, particularly dysentery and hepatitis. Travelers should also take the usual precautions against eating

raw foods and drinking unboiled tap water. Taiwan has qualified physicians and dentists, and hospitals are good.

## **Climate and Clothing**

Taiwan's weather is pleasant most of the year. However, the best months for traveling are March, April, November, and December. Summers, particularly the May-to-September season are hot and humid, but not unbearable. Typhoons strike occasionally in the period from July to September, and may interfere with business for a day or two at a time. The winter season extends from December to March, and a light topcoat is desirable. Otherwise, light summer clothes are worn all year round.

## **Hotels and Restaurants**

There are several new and modern hotels in Taipei and at least one fair-to-good hotel in the principal business centers down-island. All the better hotels have fully air-conditioned single and double rooms and suites with or without bath, plus bars, restaurants with Chinese and Western food, souvenir shops, and night clubs. In addition to hotel restaurants, Taipei and other cities have several first-class European-style restaurants and, of course, many of the world's finest Chinese restaurants. A service charge or tip of about 10 percent is standard.

## **Internal Transport**

Taxis with meters are available throughout Taiwan. Minimum fare is 12 cents for the first mile. Average fare from hotel to business district in Taipei is about 50 cents, less tip. Travel from city to city is best done

by rail or air transport. Round-trip fare by rail from Taipei to Kaoshiung (240 miles each way) is \$6. The trip takes 8 hours each way. Low-cost air service is also available. Total air travel time from Taipei to Kaoshiung is about 45 minutes and costs about \$15 round trip.

### **Making Business Contacts**

Business correspondence is normally conducted by airmail. Use of sea mail is not recommended owing to the long delivery time. Cables are freely used on appropriate occasions and the long-distance telephone service may be advantageous at times. English may be used in correspondence with most reputable firms, but one should not expect faultless English from the Taiwan firms in response.

Prior to departure for Taiwan, an American businessman may ask the United States Department of Commerce to notify the United States Commercial Attache in Taipei of his arrival and to have appropriate meetings with local businessmen arranged in advance. Upon arrival in Taiwan, United States businessmen

may avail themselves of the commercial services of the United States Embassy and arrange for appointments with Embassy commercial officers. United States businessmen may also arrange local business appointments through the Chinese Productivity and Trade Center or the Industrial Development and Investment Center, the two Government agencies concerned with foreign trade and investment. (See Appendix D for names and addresses of United States and Chinese Government agencies in Taiwan).

### **Office Hours and Holidays**

Most Government and business offices open between 8:00 and 9:00 a.m. and close about 5:00 or 6:00 p.m. Retail shops often remain open until 8:00 or 9:00 p.m.

Sundays and the following public holidays, with their approximate dates, are observed in Taiwan: January 1; Chinese New Year, usually in the latter part of January; March 29; midsummer festival, in early June; mid-autumn festival, in September or early October; September 28; October 10; November 12; and December 25.

# Import Requirements

Following is a detailed inventory of the consumption requirements of Taiwan's major industries and basic service sectors at the time this survey was made, showing which primary and intermediate materials must be imported, and the extent of import. The terms heavy, moderate, and limited, as used in the inventory, represent import values of over \$1 million, between \$100,000 and \$1 million, and under \$100,000, respectively.

Chemical industry intermediates, even though many are consumed outside the chemical industry, are all consolidated under the chemical industry listing to avoid duplication.

## A. FOOD PROCESSING AND BEVERAGE INDUSTRY

### *Raw Materials*

**Imported heavily:** wheat, soybean, other bean, barley, corn, bran, peanut and animal oils and fats; **imported moderately:** spices, malt, hops, coconut oil, peanut oil, soft drink concentrates, butter, tapioca starch, yeast, mixed feeds, and bottles; **imports fluctuate sharply:** rice; **little or no imports:** raw sugar, refined sugar, fresh fruits and vegetables, tea, salt, meat, fish, poultry, lard, eggs, condensed milk, soybean oil, wheat flour, molasses, monosodium glutamate, other food products and additives suitable for canning, bottling, and baking, cans and packaging materials.

### *Machinery and equipment*

**imported moderately:** boilers, centrifuges,

separators, concentrators, fermenters, crushers, and equipment for slaughtering, quick and dry freezing, canning, bottling, sealing and labeling; **limited imports:** baking equipment, brewing, distilling and sugar manufacturing machinery, edible oil extraction machinery and flour and grain milling machinery.

## B. DAIRY INDUSTRY CONSUMPTION

### *Raw Materials*

**imported heavily:** powdered milk; **imported from time to time in large numbers:** dairy cattle.

### *Machinery and equipment*

**imported moderately:** pasteurizing, sterilizing, homogenizing, powder-making, bottling, packaging and refrigeration equipment.

## C. TOBACCO INDUSTRY CONSUMPTION

### *Raw Materials*

**imported heavily:** tobacco leaf; **limited imports:** cigarette paper and filter materials.

### *Machinery and Equipment*

**limited imports:** cigar and cigarette making, filter-making and packaging machinery .

## D. TEXTILE AND GARMENT INDUSTRY CONSUMPTION

### *Raw Materials*

**imported heavily:** wool tops, dissolving wood pulp, rayon, polynosic, and cellulose

acetate staple fiber, polyamide filament and staple fiber, polyester filament and staple fiber; raw cotton, raw wool, caprolactum, dimethyl terephthalate, ethylene glycol, polyacrylic staple fiber, and organic dyestuffs; **imported moderately**: polyvinyl alcohol, polyvinyl chloride and polypropylene staple fiber; **little or no imports**: caustic soda, polymer resin, rayon filament and natural fibers other than cotton.

### *Semi-Manufactures*

**little or no imports**: cotton yarn, thread and piece goods, woolen and worsted yarn, thread and piece goods, man-made fiber spun yarns, thrown yarns, thread and piece goods, vegetable fiber yarns and piece goods, and blended yarns and piece goods.

### *Machinery and equipment*

#### *Cotton textile machinery*

**imported heavily**: machinery for carding, combing, doubling, spinning, bobbinning, stretching, and weaving; **imported moderately**: machinery for washing, drying, blowing, winding and folding.

#### *Woolen and worsted textile machinery*

**imported heavily**: machinery for fleece sorting, scouring, carbonizing, intersecting, gilling, combing, carding, pin drafting, bobbinning, rolling, blowing, ring spinning, mule spinning, fine yarn spinning, thread spinning, twisting, winding, warping, weaving, backwashing, drying, shearing and folding.

#### *Rayon textile machinery*

**imported heavily**: machinery for pulping, filament spinning, staple fiber spinning, coning, aftertreating, and filament weaving.

#### *Polyamide and polyester textile machinery*

**imported heavily**: machinery for polymerization, twisting, drawing and winding.

#### *Garment making and finishing machinery*

**imported moderately**: sewing, knitting, dyeing and finishing machinery.

## E. LEATHER INDUSTRY CONSUMPTION

### *Raw materials and semi-manufactures*

**imported heavily**: hides; **imported moderately**: tanning compounds; **limited imports**: upper and sole leather, patent leather, high grade upper leather, other leather, and skins (dressed and undressed); **no imports**: leather belting.

### *Machinery and Equipment*

**limited imports**: machinery for splitting, slicing, ringing, stretching, washing, drying, smoothing, sanding and ironing—**imported moderately**: shoe making and other leather manufacturing machinery.

## F. RUBBER INDUSTRY CONSUMPTION

### *Raw materials and semi-manufactures*

**imported heavily**: crude and synthetic rubber; **imported moderately**: rubber-making chemicals (accelerators, antioxydents, etc.); rubber sheets and crepe, and high tenacity tire core fabric.

### *Machinery and Equipment*

**imported moderately**: machinery for rubber mixing, rolling, extruding, molding and vulcanizing, tube making and tire building machinery, bead tubers, vacuum formers, and dipping machines; **limited imports**: rubber and fabric-cord cutting machinery, and tube and tire heating machinery.

## G. WOOD AND FURNITURE INDUSTRY CONSUMPTION

### *Raw materials and semi-manufactures*

**imported heavily**: hardwood logs; **limited imports**: high quality mahogany, walnut and other furniture woods, resins and gums; **little or no imports**: other hardwood timber, softwood timber, bamboo and cork, hard and softwood lumber, plywood, teakwood, bagasse wood veneer, wood preservatives and glue.

### *Machinery and equipment*

**imported moderately**: chain saws, band saws, circular saws, dimension saws, rotary lathes, cold and hot presses, routers, jointers, carvers, borers, clippers, dryers, splicers, spreaders, shavers, scrapers, sanders; planers, crackers, other woodworking tools, bagasse refiners, and board forming and drying machinery.

## H. PULP AND PAPER INDUSTRY CONSUMPTION

### *Raw materials*

**imported heavily**: unbleached wood pulp; **imported moderately**: chemical and mechanical wood pulp, waste paper and old newspapers and magazines for pulping; **no imports**: caustic soda, chlorine, and bagasse, rice straw, bamboo, and groundwood pulp.

### *Machinery and equipment*

**imported heavily**: machinery for pulp and paper manufacturing, paper cutting, and paper board and paperbag making machinery.



**I. PRINTING AND BOOKBINDING INDUSTRY CONSUMPTION**

**Raw materials and semi-manufactures**

**little or no imports:** common printing and newsprinting paper, printing and lithographic materials, and printing dyes and ink.

**Machinery and equipment**

**imported moderately:** machinery for offset printing, letter printing, color printing, type bounding and zinc plate making.

**J. PETROLEUM AND PETROCHEMICAL INDUSTRY CONSUMPTION**

**Raw materials and intermediates**

**imported heavily:** methanol and phthalic anhydride, crude oil; **imported moderately:** mixed xylenes and catalysts for mineral oil refining; **limited imports:** benzene, toluene, xylene; **no imports:** refinery gas, liquefied petroleum gas, naphtha, reformate, natural gas, coal tar, naphthalene, acetylene, vinyl chloride, vinyl acetate, urea, ammonia, phenol, formaldehyde, phenol formaldehyde, dodecyl benzene, and ethyl alcohol.

**Machinery and equipment**

**imported heavily:** deep well drilling rigs, pipeline, and machinery and equipment for crude oil topping, visbreaking, desulfurization, superfractionation, and catalytic reforming and cracking; natural gas treatment; aromatics extraction, dealkylation, isomerization and separation; lube oil blending; and light oil processing.

**K. PLASTICS INDUSTRY CONSUMPTION**

**Raw materials and intermediates**

**imported heavily:** petrochemical intermediates, dioctyl phthalate (DOP) and dibutyl phthalate (DBP), styrene monomer, polyethylene and polystyrene resins; **imported moderately:** stabilizers and other chemicals for plastics; **little or no imports:** calcium carbide, hydrochloric acid, vinyl chloride, polyvinyl chloride (PVC) resins and compounds, and urea, phenol, formaldehyde, and urea formaldehyde and phenol formaldehyde resins.

**Machinery and equipment**

**to be imported heavily:** equipment for making DOP, styrene, polystyrene and polyethylene; **imported moderately:** equipment for mixing, blending, polymerizing and pelletizing PVC, injection molding, extruding and rolling machinery.

**L. MINING INDUSTRY CONSUMPTION**

**Minerals**

**imported heavily:** sulfur, gypsum, iron-bearing ores and bauxite; **no imports:** coal, limestone, marble and dolomite, copper, manganese, limonite, lead, zinc, tin and nickel ores.

**Machinery and equipment**

**imported moderately:** rock drilling, mining and mineral refining machinery; **limited imports:** hand tools for mining.

**M. GLASS INDUSTRY CONSUMPTION**

**Raw materials and semi-manufactures**

**no imports:** silicon sand, limestone, dolomite, soda ash, salt cake, charcoal, and all flat glass products.

**Machinery and equipment**

**imported heavily:** refractory and annealing furnaces, and equipment for glass drawing, cutting, bonding, frosting, grinding, washing, drying, rolling, cooling, beveling, polishing, and testing.

**N. CEMENT INDUSTRY CONSUMPTION**

**Raw Materials**

**imported moderately:** gypsum; **no imports:** limestone, clay, shale, silicon, sand, and pyrite cinder.

**Machinery and equipment**

**imported heavily:** kilns, grinders, pelletizers, and coolers.

**O. BASE METALS INDUSTRY CONSUMPTION**

**Ores**

**imported heavily:** iron ore and bauxite; **limited imports:** nickel, tin, lead, zinc, manganese, chromium, platinum, cobalt, tantalum, cadmium, and other metallic ores; **no imports:** copper ore.

**Unworked metals and scrap**

**imported heavily:** unworked copper and zinc, iron and steel scrap and platinum scrap; **imported moderately:** unworked lead, aluminum alloy, nickel, tin, and iron and steel; **limited imports:** unworked brass, iron ingot, white metal and other metals; **no imports:** pig iron and kentledge.

**Semi-manufactures**

**imported heavily:** iron and steel sheets and plates (black and galvanized), tin plate, sili-

con and tool steel, iron and steel bands and strips, ball bearings, steel pipes and fittings, and iron and steel wire: **imported moderately**: brass bars, rods, sheets, plates, tubes and fittings, wire, and strips and bands; zinc sheets and plates: molybdenum, tungsten and germanium wire: iron and steel tees, joists, girders, and other structural sections and shapes: iron and steel hoops and rails; spring steel: copper bars, rods, sheets, plates, tubes and fittings; **limited imports**: nickel bars, rods, sheets, plates, tubes and fittings, and wire: tin sheets, plates, foil or leaf, and type metal: white metal bars, rods, sheets, plates, tubes and fittings, and wires; and zinc powder, foil and leaf; **little or no imports**: iron and steel angles, twisted or deformed bars, steel balls, steel cable, forgings and castings; aluminum ingot, sheets, plates, pipes and fittings, wire, foil, and powder; brass foil and leaf; copper wire with insulation of all kinds.

### **Machinery and equipment**

#### *Copper*

**imported moderately**: blast and refining furnaces, electrolyzing equipment for smelting and refining, and pumps and compressors.

#### *Aluminum*

**imported heavily**: electric arc furnaces, tapping ladles, digestors, cold mills, presses, and machinery for slab cutting and scalping, roll grinding, rough and fine foil rolling, embossing, shearing, slitting, extruding and stretching; **imported moderately**: machinery for hot rolling, paper laminating, and wire drawing and straightening; **limited imports**: pots, continuous casting molds, oil fired furnaces and slab heating equipment.

#### *Iron foundry*

**limited imports**: hot blast cupolas, arc furnaces and pneumatic rammers; **no imports**: conventional cupolas and equipment for sand preparation and molding, pit and floor molding, core-making and pouring.

#### *Steel*

**imported heavily**: electric arc furnaces, drying and heating furnaces, oxygen converters, graphite electrodes, machinery for wire and nail making, galvanizing, plasticizing and enameling, pipe and tube casting, and sheet rolling, and equipment for rail and structural mill, cold reversing mill and plate mill.

## **P. MACHINERY AND APPLIANCE INDUSTRY**

**Metallic ores and base metals**: see above

### **Electrical materials and components**

**imported moderately to heavily**: low voltage insulators, electric cord, bare copper and insulated wire, other insulated wire and cable, insulating materials, switches and sockets, permanent magnets, storage batteries and dry cells, induction motors, transformers, power capacitors, bulbs, tubes and arc lamps, welding rods, and parts for refrigerators, air conditioners, power transformers, watt-hour and water meters, and induction motors.

### **Electronic materials and components**

**imported moderately to heavily**: parts for radios and TV sets (condensers, transformers, potentiometers, resistors, transistors, diodes, crystals, vacuum tubes, print circuits, coils, volume controls, speakers and speaker parts, batteries and TV picture tubes).

### **Machinery and equipment**

**imported heavily**: precision lathes, power presses, and punching, milling, grinding, boring, shearing, broaching, trimming, polishing, slicing, gear cutting, tapping, tool and dye-making, thread rolling, shaping and contour making machines; and pneumatic, electrically operated and unpowered hand tools; **limited imports**: simple drill presses, lathes, planers, shapers, power and friction presses, and filers.

## **Q. VEHICLE-ASSEMBLY**

**Base metals**: see above

**Electrical materials**: see above

### **Vehicle parts and components**

**imported heavily**: chassis for motor tractors, trucks, and vehicles seating less than 12 persons; motor cycle parts and accessories; and other vehicle parts and accessories; **imported moderately**: bicycle parts, starter motors, dynamos, electrical ignition equipment, electrical visual signaling equipment, electric sound signaling equipment, windshield wipers and defrosters, pneumatic tires, inner-tubes and solid tires for motor vehicles; **no imports**: bicycle tires and tubes.

### **Machinery and equipment**

See listing under machinery and appliance industry, plus **moderate imports** of automatic pipe threading, front-fork making, mud-guard forming and crank processing machines, gear

hobbers, and induction heating and heat treatment equipment; **limited imports:** pipe cutting and drilling machinery, painting and electroplating equipment, shears, presses and power hammers.

## R. CHEMICAL INDUSTRY

### *General chemical industries*

**imported heavily:** sulfur and a broad range of chemicals not elsewhere identified; **imported moderately:** methyl alcohol, borax and surface active agents, alkyl benzene, ethyl fluid and calcium phosphate; **limited imports:** phosphorous, oxygen, and argon; mercury, radioactive elements, carbolic acid, and elements in a pure state; arsenious, boric, chlorosulfonic, hydrofluoric, oxalic, tartaric, stearic, oleic and fatty acids; ethyl alcohol, denatured alcohol, aniline, barium carbonate, barium chloride, copper sulphate, potassium bichromate, potassium carbonate, caustic potash, sodium bichromate, sodium bisulphite, sodium cyanide, sodium hydro-sulphite, Chile saltpetre, sodium peroxide and aromatic and aliphatic solvents; **little or no imports:** acetic, citric, glutamic, hydrochloric, and nitric acids; alum, alumina sulphate, ammonia, ammonium chloride, benzene, calcium carbide, calcium carbonate, calcium chloride, calcium hypochlorite, ethylene dichloride, creosote oil, butyl alcohol, acetone, naphthalene, formaldehyde, glycerine, magnesium carbonate, magnesium hydroxide, magnesium chloride, potassium chlorate, soda ash, sodium bicarbonate, caustic soda, sodium silicate, sodium sulphate, sodium sulphide, sodium thiosulphate, zinc chloride, zinc sulphate, chlorine, camphor, talc and menthol crystals.

### *Tanning, finishing and paint industry*

**imported heavily:** synthetic organic dye-stuffs, dye intermediates for coupling, and color lakes; **imported moderately:** mimosa extract for tanning; carbon black, lithopone, titanium dioxide, chrome yellow and Prussian blue pigments, linseed oil, stearine, turpentine, shellac, and gums and resins; **limited imports:** gambier, gallnuts, wattle bark, and quebracho extract for tanning; bronze powder, cobalt oxide, ochre, sienna and umber, red, white and yellow lead, ultramarine, emerald green, vermilion, zinc oxide and antimony trisulphide pigments; **no imports:** turmeric and bark yellow dyestuffs.

### *Pharmaceutical industry*

**imported heavily:** glucuronic acid, ascorbic

acid, enzymes, and aminosalicic acid; anti-biotic ingredients, (tetracycline, chlortetracycline, oxytetracycline, chloramphenicol, oleandomycin, carbarsone and nitrofurantoin); sulfa drug ingredients (sulfadiozine, sulfamerazine, sulfamethazine, and sulfisoxazole); hormone ingredients (dexamethazone, estradiol benzoate, progesterone, prednisolone, testosterone propionate, and testosterone cyclopentyl propionate NNR); ingredients for hypotensive agents (mebutamate, adrenochrome monosemicarbazone, di-methionine, and inositol); and miscellaneous ingredients for vitamins, antihistaminic drugs, antitussives and expectorants, tranquilizers, dermatics, and gastro-intestinal medicines; **no imports:** glucose, caffeine, soda and certain ingredients for anti-pyretics and analgesics (sulpyrine, aminopyrine, phenacetin, antipyrine and acetanilide).

### *Machinery and equipment*

**imported heavily:** machinery for manufacturing inorganic acids; fertilizer; industrial solvents and paints; alkalis; and pharmaceutical, washing, siliconizing, sterilizing, drying, granulating, tablet making, filling, sealing, packaging and labeling machines, and vacuum lypholizers.

## S. GENERAL INDUSTRIAL

### *Fuels and other petroleum and coal products*

**imported heavily:** lubricating oil; **imported moderately:** lubricating grease, transformer oil and petroleum coke; **little or no imports:** fuel oil, diesel and motor oil, kerosene, gasoline, naphtha, benzene, aviation gasoline, turbine fuel, jet fuel, liquefied petroleum gas, general purpose oils, and coke other than petroleum coke.

### *Power generating machinery*

**imported heavily:** machinery for high voltage generation, such as high voltage generators, capacitors, motors above 1 h.p., transformers, converters, switchboards, circuit breakers, inductors, regulators, resistors, rheostats, compensators, and others; **imported moderately:** machinery for low voltage generation, such as low voltage dynamotors, regulators, rotary transformers and converters, vibrator converters, ballasts, bell transformers, battery chargers and others.

### *Prime movers and steam boilers*

**imported heavily:** internal combustion engines, such as gas engines and diesel marine engines; steam engines and turbines; **im-**

**ported moderately:** steam boilers, boiler house plant, boiler fittings and mountings.

#### ***Air conditioning and refrigeration equipment***

**imported moderately:** central air conditioning systems (complete, packaged or self-contained); industrial refrigerators, and refrigerating equipment.

#### ***Pumps, pumping machinery and compressors***

**imported heavily:** all types.

#### ***Materials handling equipment***

**imported moderately:** mechanically propelled vehicles for use in railway stations, warehouses, and short distance handling of goods.

#### ***Scientific and testing instruments***

**imported heavily:** automatic control instrumentation; instruments for testing properties of electricity, chemical composition, light, tensile strength, viscosity, fineness, density, moisture, friction, abrasion, hardness, distortion, fatigue, and bending; and other miscellaneous scientific instruments; **limited imports:** optical instruments.

#### ***Office machinery***

**imported moderately:** typewriters, manual and electric calculators, photo-mechanical equipment, copying and blueprint machines; tape labeling, franking, dating, numbering, and time recording machines; automatic sales machines, cash registers, and computers.

#### ***Miscellaneous machinery components and parts***

**imported heavily:** all general types.

### **T. BUILDING AND CONSTRUCTION**

#### ***Structural materials***

**imported moderately:** gypsum, pitch and asphalt, firebrick, paperboards, and iron and steel structural forms and sections; **limited imports:** tiles, linoleum and floor coverings, asbestos, mill-board, and structural forms and sections of non-ferrous metals; **little or no imports:** cement, glass, bricks, plywood, sawn and manufactured hardwood and softwood timber, asphalt roofing and felt, waterproofed building paper, and other building materials.

#### ***Plumbing fixture and fittings***

**limited imports:** metal and ceramic sinks, tubs and other sanitary fixtures.

#### ***Electrical materials, fixtures and fittings***

**imported moderately:** wiring and insulating materials: cleats, insulators or knobs, ceiling rosettes, fuse-boxes, plugs, receptacles, sockets, and household switches and switchboards; other household electrical fixtures and fittings.

#### ***Hardware***

**imported moderately:** iron or steel bolts, nuts, washers, nails, rivets, screws, and tacks; locks and padlocks; hand tools; **limited imports:** bolts, nuts, and similar products made of non-ferrous metals, and other hardware.

#### ***Construction machinery***

**imported heavily:** machinery for conveying, lifting, excavating and road construction.

### **U. TRANSPORT SERVICES**

#### ***Railway transport***

**imported heavily:** diesel locomotives and railcars, trailers, reversible-chain passenger coaches and baggage cars, and automatic traffic control equipment; **imported moderately:** steam locomotives and tenders, and rails; **no imports:** wood and aluminum passenger and freight cars, railway ties.

#### ***Road transport***

**imported moderately:** buses and trucks; **limited imports:** motor trailers and tractors, jeeps, ambulances, fire engines, sedans, and traffic control equipment.

#### ***Sea transport***

**imported heavily:** ships and boats, cargo handling facilities, and harbor construction equipment.

#### ***Air transport***

**imported heavily:** aircraft engines and parts and air navigation equipment.

### **V. TELECOMMUNICATIONS SERVICES**

**imported heavily:** line telephonic, telegraphic, and radio-telephonic apparatus, microwave equipment, radio and TV broadcasting apparatus, and antenna equipment; **limited imports:** radar apparatus, hydrophones, radio remote control apparatus, radio beacons, radio sondes and radio fish finders; radio depth sounders, direction finders and other radio navigation apparatus.

### **W. HEALTH SERVICES**

#### ***Medicines and drugs***

**imported moderately to heavily:** antibiot-

ics, sulfa drugs, vitamins, central nervous system depressants, gastro-intestinal agents, anti-infectives, nutrients, hormones, autonomic drugs, enzymes, hematological agents, cardiovascular agents, antihistamines and dermatological agents; **limited imports:** serums and vaccines, central nervous system stimulants, local anesthetics, oral contraceptives, detoxication agents, and anti-neoplastic agents; **no imports:** antipyretics and analgesics.

#### **Medical equipment**

**imported moderately:** surgical, medical and dental instruments.

### **X. FARMING INDUSTRY**

#### **Raw materials**

##### **Seeds**

**imported moderately:** sesamum, rape, leek, turnip, and radish seeds; **limited imports:** apricot, melon, grass, clover and other seeds.

##### **Fertilizer**

**imported heavily:** ammonium sulfate, phosphate rock, potassium sulfate and potassium

chloride; **imported moderately:** ammonium phosphate; **limited imports:** urea, calcium superphosphate, nitrophosphate, calcium cyanamide and nitrochalk.

#### **Insecticides and fungicides**

**imported heavily:** parathion, methyl parathion, sumithion, drivon, fumiron, diazinon, endrin, dieldrin, aldrin, pyrethrin, sevin, phosdrin, ekatin, arozin, heptachlor, tuzet, manzet, lime sulfur, agrosan, granosan, lebaycid, folidol, dithane, kelthane, karathane, chlordane, dipterex, soilcin, metasystox, EPN, PIN; **imported moderately:** malathion, DDVP, and PMA; **limited imports:** DDT, BHC, rotanone, and 2,4-D.

#### **Machinery and implements**

**imported moderately:** power tillers and other machines for preparing and cultivating soil; water pumps; **limited imports:** machinery for harvesting, threshing, and sorting; shovels, spades, hoes, animal driven ploughs and other farming implements; hand-operated insecticide or fertilizer sprayers.



# Basic Economic Data

**Table 1. Estimated Distribution of National Income, 1965**  
(Values in U.S. dollars, rounded)

|  | Aggregate income | Income earners | Income per earner | Number of households | Income per household | Population supported | Income per person |
|--|------------------|----------------|-------------------|----------------------|----------------------|----------------------|-------------------|
| Total national income .....                                  | 2,297,000,000    |                |                   |                      |                      |                      |                   |
| Total household income .....                                 | 2,126,000,000    | 3,755,300      | 566               | 2,257,000            | 942                  | 12,628,000           | 168               |
| Farmers .....  | 485,000,000      | 2,015,000      | 241               | 847,200              | 573                  | 5,739,000            | 85                |
| Salaried workers .....                                       | 1,075,000,000    | 1,474,300      | 729               | 1,194,300            | 900                  | 5,836,000            | 184               |
| Professionals, entrepreneurs, and other income earners ..... | 567,000,000      | 266,000        | 2,130             | 215,500              | 2,629                | 1,053,000            | 538               |
| Total nonhousehold income .....                              | 171,000,000      |                |                   |                      |                      |                      |                   |

**Table 2. Composition of Private Consumption Expenditure, 1965**  
(In U.S. dollars, rounded)

| Category of expenditure              | Aggregate expenditure | Expenditure per household | Expenditure per capita |
|--------------------------------------|-----------------------|---------------------------|------------------------|
| All categories .....                 | 1,786,000,000         | 79.13                     | 14.14                  |
| Food and beverages .....             | 913,000,000           | 40.45                     | 7.23                   |
| Tobacco .....                        | 82,000,000            | 3.63                      | 0.65                   |
| Clothing and personal effects .....  | 100,000,000           | 4.43                      | 0.79                   |
| Rent and household furnishings ..... | 250,000,000           | 11.08                     | 1.98                   |
| Fuel and light .....                 | 71,000,000            | 3.15                      | 0.56                   |
| Medical and health .....             | 114,000,000           | 5.05                      | 0.90                   |
| Recreation and entertainment .....   | 49,000,000            | 2.17                      | 0.39                   |
| Transport and communications .....   | 33,000,000            | 1.46                      | 0.26                   |
| Miscellaneous services .....         | 174,000,000           | 7.71                      | 1.33                   |

Source: National income of the Republic of China, 1958-1966.

**Table 3. Principal Mineral Reserves of Taiwan, end of 1965**

| Ore                      | Locality   | Unit                | Reserve     | Grade and content   |
|--------------------------|--|---------------------|-------------|---|
| Coal                     | Taipei, Keelung, Taoyuan, Hsinchu<br>Miaoli, Nantou, Chiayi  | m. t.               | 260,000,000 | Technically workable reserve only.  |
| Gold (hydrothermal)      | Juifang (Taipei prefecture)  | m. t.               | 7,484,400   | Gold content: 4-10,000g/m.t.  |
| Copper (containing gold) | Juifang (Taipei prefecture)  | m. t.               | 5,686,000   | Copper content: 1-0.7%<br>Remaining workable reserve is estimated at about 4,700,000 m.t. |
| Pyrite                   | Chihsinshan, Juifang (Taipei prefecture)   | m. t.               | 2,241,500   | Sulfur content: 7-30%   |
| Placer magnetite         | Tananao (Yilan) Tungmeng (Hwalien)<br>Chinshan, Tanshui (Taipei prefecture)<br>Chuwei, (Taoyuan) Chengkong (Taitung) | m. t.               | 291,000     |   |
| Limonite                 | Taoyuan, Hsinchu, Taichung Shihsingshan  | m. t.               | 993,100     | Iron content: 35%   |
| Manganese                | Simaoshan (Yilan)  | m. t.               | 300,000     | Manganese content: 25%  |
| Ilmenite                 | Tainan, Chiayi, Sinchu, Taoyuan,<br>Taipei   | m. t.               | 45,000      |   |
| Zircon Ore               | Tainan, Chiayi, Sinchu, Taoyuan.   | m. t.               | 24,000      |   |
| Monazite                 | Tainan, Chiayi, Sinchu, Taoyuan.   | m. t.               | 9,000       |   |
| Sulfur                   | Chihsinshan, (Taipei prefecture)<br>Chinshan, Peitou, (Yangmingshan)   | m. t.               | 2,606,500   | Sulfur content: 10-30%  |
| Petroleum                | Chukuangkeng, Chinshui, (Miaoli)   | k. l.               | 969,100     | With proved reserves of 14.6  |
| Natural gas              | Chutung (Hsinchu), Chukuangkeng,<br>Chinshui (Miaoli)  | 1,000m <sup>3</sup> | 26,800,000  |   |
| Asbestos                 | Fengtien (Hwalien)   | m. t.               | 99,200      |   |
| Dolomite                 | Tachoshai, Chiyakangchi,<br>Chingchanchi (Hwalien)   | m. t.               | 119,916,700 | 18-21% MgO.   |
| Marble                   | Wuyen, Suao, (Yilan)<br>Shanjanchi (Hwalien)   | 1,000m.t.           | 299,995,900 |   |
| Talc                     | Nanao (Yilan); Fengtien, Yuli (Hwalien)  | m. t.               | 2,668,000   |   |
| Glass sand               | Hsinchu, Miaoli  | m. t.               | 82,791,000  |   |

Source: Taiwan Statistical Data Book, 1966.

**Table 4. Characteristics of Taiwan Population, 1960 and 1965**

|   | 1960<br>(Thousands) | 1965   | Percent<br>increase,<br>1960-65 | Percent<br>of total<br>Popula-<br>tion, 1965 |
|---|---------------------|--------|---------------------------------|--|
| Population, total .....                           | 10,792              | 12,628 | 17.0                            | 100.0  |
| Household (units) .....                           | 1,940               | 2,257  | 16.3                            | .....  |
| <b>Sex and marital status:</b>                    |                     |        |                                 |  |
| Males .....                                       | 5,525               | 6,492  | 17.5                            | 51.4   |
| Females .....                                     | 5,267               | 6,137  | 16.5                            | 48.6   |
| Married males .....                               | 1,849               | 2,189  | 18.4                            | 17.3   |
| Married females .....                             | 1,868               | 2,184  | 16.9                            | 17.3   |
| Widowed .....                                     | 405                 | 421    | 3.9                             | 3.3  |
| Divorced .....                                    | 44                  | 55     | 25.0                            | 0.4  |
| <b>Age structure:</b>                             |                     |        |                                 |  |
| Age under 15 .....                                | 4,904               | 5,667  | 15.6                            | 44.9   |
| Age 15-59 .....                                   | 5,439               | 6,393  | 17.5                            | 50.6   |
| Age over 60 .....                                 | 449                 | 568    | 26.5                            | 4.5  |
| <b>Residence:</b>                                 |                     |        |                                 |  |
| Taipei .....                                      | .....               | 1,136  | .....                           | 9.0  |
| Kaohsiung .....                                   | .....               | 596    | .....                           | 4.7  |
| Tainan .....                                      | .....               | 400    | .....                           | 3.2  |
| Taichung .....                                    | .....               | 364    | .....                           | 2.9  |
| Keelung .....                                     | .....               | 278    | .....                           | 2.2  |
| Yangminshan .....                                 | .....               | 145    | .....                           | 1.1  |
| Rural areas .....                                 | .....               | 9,709  | .....                           | 76.9   |
| <b>Education and literacy (age 12 and above):</b> |                     |        |                                 |  |
| Higher education .....                            | 160                 | 238    | 48.8                            | 1.9  |
| Secondary education .....                         | 1,047               | 1,550  | 48.0                            | 12.3   |
| Primary education .....                           | 4,594               | 5,679  | 23.6                            | 45.0   |
| Illiterate .....                                  | 2,301               | 2,369  | 3.0                             | 18.8   |
| <b>Labor (age 12 and above):</b>                  |                     |        |                                 |  |
| Jobless, students, and                            |                     |        |                                 |  |
| housewives .....                                  | 3,186               | 3,236  | 1.6                             | 25.6   |
| Gainfully employed: .....                         | 3,343               | 3,756  | 12.4                            | 29.7   |
| Agriculture .....                                 | 1,877               | 2,017  | 7.5                             | 16.0   |
| Trans. and Comm. .....                            | 99                  | 121    | 22.2                            | 1.0  |
| Mining and manufacture .....                      | 377                 | 449    | 19.1                            | 3.6  |
| Commerce .....                                    | 298                 | 336    | 12.8                            | 2.7  |
| Public service .....                              | 134                 | 163    | 21.6                            | 1.3  |
| Personal service .....                            | 309                 | 339    | 9.7                             | 2.7  |
| Professions .....                                 | 115                 | 151    | 31.3                            | 1.2  |
| Others .....                                      | 134                 | 180    | 34.3                            | 1.4  |

Source: Statistical Abstract of the Republic of China, 1966.

**Table 5. Taiwan National Accounts, 1960 and 1965**  
(Millions of current U.S. \$, rounded)

|  | 1960  | 1965  | Percent<br>increase,<br>1960-65 |
|--|-------|-------|---------------------------------|
| Gross national product .....             | 1,720 | 2,828 | 64.4                            |
| National income .....                    | 1,397 | 2,297 | 64.4                            |
| Per capital income (in dollars) .....    | 125   | 177   | 41.6                            |
| Net domestic product .....               | 1,397 | 2,306 | 65.1                            |
| Agriculture .....                        | 454   | 620   | 36.6                            |
| Mining .....                             | 32    | 48    | 50.0                            |
| Manufacturing .....                      | 233   | 432   | 85.4                            |
| Power and water .....                    | 18    | 42    | 133.3                           |
| Construction .....                       | 62    | 92    | 48.3                            |
| Transport and communication .....        | 57    | 105   | 84.2                            |
| Wholesale and retail trade .....         | 202   | 381   | 88.6                            |
| Banking, insurance, real estate .....    | 22    | 55    | 150.0                           |
| Gross domestic capital formation .....   | 346   | 638   | 84.3                            |
| Fixed capital formation .....            | 284   | 463   | 63.0                            |
| Dwellings .....                          | 39    | 47    | 20.5                            |
| Buildings .....                          | 57    | 77    | 35.1                            |
| Construction and public works .....      | 56    | 70    | 25.0                            |
| Transport equipment .....                | 28    | 46    | 64.2                            |
| Machinery and other equipment .....      | 104   | 224   | 115.4                           |
| Increase in stocks .....                 | 61    | 174   | 185.2                           |
| Private consumption expenditure .....    | 1,119 | 1,786 | 59.6                            |
| Government consumption expenditure ..... | 298   | 481   | 61.4                            |

Source: National Income of the Republic of China, 1958-1966.

**Table 6. Output of Minerals, Construction and Utilities**

|  | Unit               | 1960    | 1965      | Percent<br>change<br>1960-65 |
|--|--------------------|---------|-----------|------------------------------|
| Salt .....   | m.t.               | 453,244 | 560,044   | + 24                         |
| Gold .....   | hg.                | 4,884   | 9,999     | + 105                        |
| Silver .....   | hg.                | 16,354  | 27,158    | + 66                         |
| <b>Electrolytic</b>                                    |                    |         |           |                              |
| copper .....   | m.t.               | 1,780   | 1,885     | + 6                          |
| Pyrite .....   | m.t.               | 42,997  | 39,260    | - 9                          |
| Sulfur .....   | m.t.               | 5,817   | 6,881     | + 18                         |
| Gypsum .....   | m.t.               | 8,347   | 23,627    | + 183                        |
| Marble .....   | m.t.               | 727,156 | 899,480   | + 24                         |
| Talc .....   | m.t.               | 10,557  | 15,229    | + 24                         |
| Dolomite .....   | m.t.               | 15,008  | 50,577    | + 237                        |
| Asbestos .....   | m.t.               | 440     | 801       | + 82                         |
| Coal .....   | 1,000 m.t.         | 3,962   | 5,054     | + 27                         |
| Crude petroleum..                                      | kl.                | 2,256   | 20,835    | + 824                        |
| Natural gas .....                                      | 1,000 cubic meters | 25,438  | 309,676   | +1,117                       |
| <b>Construction of buildings</b><br>[In square meters] |                    |         |           |                              |
| Brick construction .....                               |                    | 378,367 | 1,039,386 | + 175                        |
| Reinforced concrete construction .....                 |                    | 30,941  | 698,326   | +2,157                       |
| Wooden construction .....                              |                    | 18,129  | 42,698    | + 136                        |
| Others .....   |                    | 8,309   | 14,889    | + 79                         |
| <b>Output of public utilities</b>                      |                    |         |           |                              |
| Electric power ....                                    | million k.w.h.     | 3,628   | 6,455     | 78                           |
| Gas .....  | 1,000 cubic meters | 5,321   | 51,040    | 859                          |
| City water .....                                       | 1,000 cubic meters | 229,227 | 274,771   | 20                           |

Source: Industry of Free China.

Conversions: 1 m.t.=2,204.6 lbs.

1 hg.=3.53 oz.

1 kl.=264.2 gallons

1 cubic meter=1.3 cubic yards or 908 quarts

1 sq. meter=10.8 square feet

**Table 7. Output of Principal Industrial Products**

|                          | Unit           | 1960      | 1965      | Percent<br>change,<br>1960-65 |
|--------------------------|----------------|-----------|-----------|-------------------------------|
| Refined sugar .....      | 1,000 m.t.     | 774       | 1,006     | + 30                          |
| Canned pineapple .....   | 1,000 cases    | 2,227     | 4,306     | + 93                          |
| Wheat flour .....        | m.t.           | 189,819   | 260,528   | + 37                          |
| Alcoholic beverages .... | h.l.           | 981,443   | 1,225,582 | + 25                          |
| Cigarettes .....         | million pieces | 11,851    | 13,664    | + 15                          |
| Cotton yarn .....        | bales          | 222,562   | 302,780   | + 36                          |
| Cotton fabrics .....     | 1,000 meters   | 176,202   | 230,018   | + 31                          |
| Rayon filament .....     | m.t.           | 1,762     | 2,320     | + 32                          |
| Polyvinyl chloride ..... | m.t.           | 3,418     | 25,305    | +640                          |
| Paper .....              | m.t.           | 97,268    | 138,877   | + 43                          |
| Caustic soda .....       | m.t.           | 32,759    | 57,435    | + 75                          |
| Soda ash .....           | m.t.           | 11,290    | 16,851    | + 49                          |
| Fertilizer .....         | m.t.           | 375,205   | 1,033,868 | +176                          |
| Crude oil refined .....  | k.l.           | 1,275,739 | 2,096,903 | + 64                          |
| Plate glass .....        | cases          | 468,802   | 703,776   | + 50                          |
| Cement .....             | 1,000 m.t.     | 1,183     | 2,444     | +107                          |
| Pig iron .....           | m.t.           | 24,444    | 72,038    | +195                          |
| Steel bar .....          | m.t.           | 200,528   | 259,900   | + 30                          |
| Aluminum ingot .....     | m.t.           | 8,260     | 18,912    | +129                          |
| General machinery .....  | m.t.           | 19,308    | 82,466    | +327                          |
| Sewing machines .....    | sets           | 61,817    | 79,473    | + 29                          |
| Electric fans .....      | sets           | 203,843   | 186,817   | - 8                           |
| Fluorescent lamps .....  | pieces         | 781,034   | 4,110,896 | +426                          |
| Wathour meters .....     | pieces         | 218,004   | 148,962   | - 32                          |
| Shipbuilding .....       | m.t.           | 27,051    | 12,085    | - 55                          |

Source: Taiwan Statistical Data Book, 1966.

Conversions: 1 metric ton (m.t.)=2204.6 lbs.; 1 meter=1.09 yards

1 hectoliter (h.l.)=26.4 gallons

1 kiloliter (k.l.)=264.2 gallons



**Table 8. Output of Principal Agricultural Products, 1960 and 1965**

| Unit           | 1960              | 1965      | Percent change, 1960-65 |
|----------------|-------------------|-----------|-------------------------|
| Sugarcane      | 1,000 metric tons | 6,736     | 9,490 + 41              |
| Rice (brown)   | 1,000 metric tons | 1,912     | 2,348 + 23              |
| Sweet potatoes | 1,000 metric tons | 2,979     | 3,131 + 5               |
| Wheat          | metric tons       | 45,574    | 23,492 - 48             |
| Soybeans       | metric tons       | 52,653    | 65,709 + 25             |
| Peanuts        | metric tons       | 102,167   | 125,817 + 23            |
| Cotton         | metric tons       | 2,143     | 2,289 + 7               |
| Jute           | metric tons       | 20,810    | 17,228 - 17             |
| Tea            | metric tons       | 17,365    | 20,730 + 19             |
| Bananas        | metric tons       | 114,216   | 452,210 +296            |
| Pineapple      | metric tons       | 166,730   | 231,005 + 39            |
| Citrus fruit   | metric tons       | 52,866    | 114,434 +116            |
| Citronella     | metric tons       | 73,401    | 132,437 + 80            |
| Timber         | cubic meters      | 822,325   | 1,116,915 + 36          |
| Conifers       | cubic meters      | 483,246   | 779,030 + 61            |
| Hardwoods      | cubic meters      | 339,079   | 337,885 - 1             |
| Fisheries      | head caught       | 259,140   | 381,688 + 47            |
| Pelagic        | head caught       | 85,210    | 135,949 + 60            |
| Inshore        | head caught       | 94,856    | 160,924 + 70            |
| Coastal        | head caught       | 30,044    | 30,655 + 2              |
| Pond           | head caught       | 49,030    | 54,160 + 10             |
| Cattle         | head slaughtered  | 19,459    | 28,485 + 46             |
| Hogs           | head slaughtered  | 2,063,591 | 2,687,667 + 30          |
| Goats          | head slaughtered  | 29,441    | 38,430 + 31             |

Source: Taiwan Statistical Data Book.

Conversions: 1 metric ton (m.t.)=2204.6 lbs.  
1 cubic meter=1.3 cubic yards

**Table 9. Registered Factories by Industry and Size, 1964**

| Industry                          | Total number  | Large scale  | Small scale   | as percent of total |
|-----------------------------------|---------------|--------------|---------------|---------------------|
| <b>Total</b>                      | <b>27,498</b> | <b>4,524</b> | <b>22,974</b> | <b>84</b>           |
| Food processing                   | 11,197        | 683          | 10,514        | 94                  |
| Chemicals                         | 2,953         | 753          | 2,200         | 75                  |
| Nonmetallic mineral manufactures  | 2,073         | 487          | 1,586         | 77                  |
| Machinery                         | 1,953         | 282          | 1,671         | 86                  |
| Textiles and clothing             | 1,512         | 585          | 929           | 61                  |
| Timber and lumber                 | 1,370         | 467          | 912           | 66                  |
| Metal manufactures                | 1,271         | 176          | 1,095         | 86                  |
| Printing and bookbinding          | 881           | 75           | 806           | 91                  |
| Beverages                         | 828           | 32           | 796           | 96                  |
| Transport equipment               | 641           | 191          | 450           | 70                  |
| Electric materials and appliances | 607           | 139          | 468           | 77                  |
| Rubber                            | 287           | 157          | 130           | 45                  |
| Paper                             | 240           | 88           | 152           | 63                  |
| Furniture                         | 182           | 26           | 156           | 86                  |
| Leather                           | 170           | 43           | 127           | 75                  |
| Base metals                       | 105           | 60           | 45            | 43                  |
| Oil and coal products             | 93            | 21           | 72            | 77                  |
| Others                            | 1,126         | 261          | 865           | 77                  |

Note: Small-scale factories are those capitalized below \$2,500, using less than five horsepower, and employing fewer than 30 workers. All others are classified as large-scale.

Source: Office of Accounts and Statistics, Department of Reconstruction, Taiwan Provincial Government.

**Table 10. Principal Financial Indicators (NT \$ millions, rounded)\***

|  | End 1960 | End 1965 | End 1966 |
|--|----------|----------|----------|
| Money supply                           | 6,110    | 14,845   | 17,393   |
| Currency issued                        | 2,905    | 6,458    | 7,329    |
| Deposits                               | 12,006   | 35,557   | 43,532   |
| Government agencies                    | 2,139    | 5,279    | 7,990    |
| Government enterprises                 | 962      | 1,591    | 1,856    |
| Private enterprises                    | 1,776    | 4,984    | 6,277    |
| Individuals                            | 4,504    | 18,097   | 24,000   |
| Foreign                                | 2,625    | 5,606    | 4,309    |
| Loans and discounts                    | 9,371    | 26,090   | 30,427   |
| Government agencies                    | 145      | 994      | 1,682    |
| Government enterprises                 | 3,662    | 5,922    | 6,246    |
| Private enterprises                    | 4,806    | 15,007   | 17,464   |
| Individuals                            | 758      | 4,169    | 5,034    |
| Bank clearings                         | 10,003   | 22,771   | 28,737   |
| Registered capital of all corporations | 11,026   | 24,966   | 28,318   |
| Tax revenues                           | 6,992    | 11,973   | .....    |
| Income tax                             | 704      | 1,361    | .....    |
| Customs duties                         | 1,354    | 2,987    | .....    |
| Harbor due                             | 198      | 418      | .....    |
| Commodity tax                          | 970      | 2,073    | .....    |
| Defense tax                            | 960      | 1,077    | .....    |
| Expenditures by Government             | 12,193   | 22,633   | .....    |
| Administrative and defense             | 7,790    | 12,998   | .....    |
| Education, science, and culture        | 1,533    | 2,681    | .....    |
| Reconstruction and communications      | 1,387    | 1,742    | .....    |
| Health and welfare                     | 534      | 939      | .....    |
| Taipei wholesale price index 1956=100  | 140.46   | 155.43   | 157.72   |
| Taiwan consumer price index 1956=100   | 149.21   | 167.90   | 171.26   |

Source: Central Bank of China; Bureau of Accounts and Statistics.

\* 1960 NT \$36.38=US\$1

1965 NT \$40.00=US\$1

1966 NT \$40.00=US\$1

**Table 11. Standard Bank Charges for Foreign Exchange Business**

| Item   | Rate or charge   |
|--|--|
| <b>Remittances in Foreign currency</b>                         | 0.25% of amount remitted   |
| <b>Export</b>  |  |
| Negotiation of draft under L/C                                 | 0.20% of amount of draft   |
| Advance settlement   | 0.10% of amount of draft   |
| Collection   | 0.10% of amount of draft   |
| <b>Import</b>  |  |
| Opening unconfirmed L/C  | 0.25% for first three months; 0.125% per month thereafter; minimum charge \$10                                     |
| Opening confirmed L/C  | 0.35% for first three months; 0.125% per month thereafter; minimum charge \$12.50                                  |
| Payment  | 0.25% ; minimum charge \$5   |
| Collection   | 0.125% ; minimum charge \$5  |
| Extension of L/C   | 0.125% ; minimum charge \$5  |
| Amendment of L/C   | \$5 per case   |
| <b>Other services for importers</b>                            |  |
| Guaranty payment of import duty (Taiwan Supply Bureau service) | 1% of amount of duty   |
| Loans for payment of import duty (TSB)                         | 1.29% per month  |
| Loans to pay up to 70% of import cost                          | 0.625% per month for raw materials processed into exports<br>0.825% per month for raw materials retained in Taiwan |



# Foreign Trade Data

**Table 12. Value of Taiwan's Imports and Exports, 1952-65**

| Period     | Total Value (US\$1,000) |                      |         |
|------------|-------------------------|----------------------|---------|
|            | Total Trade             | Imports <sup>1</sup> | Exports |
| 1952 ..... | 326,507                 | 206,980              | 119,527 |
| 1953 ..... | 320,390                 | 190,597              | 129,793 |
| 1954 ..... | 301,732                 | 203,976              | 97,756  |
| 1955 ..... | 323,506                 | 190,065              | 133,441 |
| 1956 ..... | 358,285                 | 228,225              | 130,060 |
| 1957 ..... | 420,741                 | 252,235              | 168,506 |
| 1958 ..... | 397,218                 | 232,785              | 164,433 |
| 1959 ..... | 404,890                 | 244,350              | 160,540 |
| 1960 ..... | 422,082                 | 252,216              | 169,866 |
| 1961 ..... | 538,091                 | 324,050              | 214,041 |
| 1962 ..... | 566,151                 | 327,542              | 238,609 |
| 1963 ..... | 694,311                 | 336,787              | 357,524 |
| 1964 ..... | 873,511                 | 410,401              | 463,110 |
| 1965 ..... | 1,044,361               | 556,402              | 487,959 |

Sources: Bank of Taiwan, Council for International Economic Cooperation and Development (CIECD).

<sup>1</sup> Note: Including bank's exchange settlements, U.S. Aid and others.

**Table 13. Financial Sources of Imports, 1960-65**

| Period     | Value (US\$1,000) |                             |          |        | Percentage distribution |                             |          |        |
|------------|-------------------|-----------------------------|----------|--------|-------------------------|-----------------------------|----------|--------|
|            | Total             | Bank's exchange settlements | U.S. aid | Others | Total                   | Bank's exchange settlements | U.S. Aid | Others |
| 1960 ..... | 252,216           | 143,233                     | 90,892   | 18,091 | 100.0                   | 56.8                        | 36.0     | 7.2    |
| 1961 ..... | 324,050           | 192,362                     | 108,176  | 23,512 | 100.0                   | 59.4                        | 33.4     | 7.2    |
| 1962 ..... | 327,542           | 224,604                     | 80,110   | 22,828 | 100.0                   | 68.5                        | 24.5     | 7.0    |
| 1963 ..... | 336,787           | 226,469                     | 76,069   | 34,249 | 100.0                   | 67.2                        | 22.6     | 10.2   |
| 1964 ..... | 410,401           | 333,967                     | 39,670   | 36,764 | 100.0                   | 81.4                        | 9.7      | 8.9    |
| 1965 ..... | 556,402           | 453,444                     | 67,024   | 35,934 | 100.0                   | 81.5                        | 12.0     | 6.5    |

Sources: Bank of Taiwan, CIECD.

**Table 14. Value of Principal Imports by Commodities, 1960-65**  
(Unit: US\$1,000)

| Period     | Total   | Machinery & tools | Ores, metals & products | Vehicles, vessels & parts | Electrical materials | Chemical fertilizer | Raw cotton | Textile Products | Wheat & cereals |
|------------|---------|-------------------|-------------------------|---------------------------|----------------------|---------------------|------------|------------------|-----------------|
| 1960 ..... | 252,216 | 35,738            | 36,287                  | 20,903                    | 7,797                | 15,571              | 20,246     | 985              | 17,019          |
| 1961 ..... | 324,050 | 48,841            | 44,165                  | 27,136                    | 10,008               | 17,099              | 29,758     | 633              | 19,863          |
| 1962 ..... | 327,542 | 51,204            | 47,459                  | 16,413                    | 10,310               | 11,455              | 35,163     | 799              | 22,890          |
| 1963 ..... | 336,787 | 49,029            | 42,566                  | 18,277                    | 9,210                | 15,609              | 26,503     | 184              | 29,411          |
| 1964 ..... | 410,401 | 53,148            | 62,877                  | 27,262                    | 13,932               | 9,929               | 33,218     | 462              | 22,458          |
| 1965 ..... | 556,402 | 85,531            | 90,596                  | 40,474                    | 26,929               | 16,169              | 39,417     | 662              | 35,954          |

| Period     | Wheat flour | Bean & peas | Crude & fuel oil | Chemicals | Pharmaceuticals | Wool, rayon & products | Oil & wax | Rubber & products | Lumber timber & products | Others |
|------------|-------------|-------------|------------------|-----------|-----------------|------------------------|-----------|-------------------|--------------------------|--------|
| 1960 ..... | .....       | 16,962      | 11,060           | 7,663     | 7,239           | 7,758                  | 5,609     | 4,774             | 2,698                    | 33,907 |
| 1961 ..... | .....       | 13,854      | 14,491           | 10,032    | 12,677          | 12,081                 | 6,924     | 4,759             | 4,911                    | 46,818 |
| 1962 ..... | .....       | 10,513      | 18,712           | 10,254    | 12,695          | 15,770                 | 7,953     | 4,259             | 7,812                    | 43,881 |
| 1963 ..... | .....       | 20,661      | 20,484           | 11,910    | 10,014          | 15,353                 | 7,474     | 3,746             | 12,621                   | 43,735 |
| 1964 ..... | .....       | 19,759      | 19,132           | 15,459    | 13,626          | 28,354                 | 9,684     | 5,683             | 12,494                   | 62,924 |
| 1965 ..... | .....       | 18,618      | 24,933           | 22,276    | 15,752          | 30,611                 | 10,840    | 6,487             | 18,524                   | 72,629 |

Sources: Bank of Taiwan, CIECD.

Table 15. Taiwan's Imports by Countries of Origin,<sup>1</sup> 1960-65

| Period             | Total   | U.S.A.  | Japan   | Germany, Rep. of | Kuwait | Hong-Kong | United Kingdom | Australia | Philippines | Singapore & Malaya | Saudi Arabia | Iraq  | Others |
|--------------------|---------|---------|---------|------------------|--------|-----------|----------------|-----------|-------------|--------------------|--------------|-------|--------|
| Amount (US\$1,000) |         |         |         |                  |        |           |                |           |             |                    |              |       |        |
| 1960               | 252,216 | 102,940 | 87,208  | 11,330           | 7,343  | 5,064     | 3,918          | 3,395     | 2,480       | 2,148              | 1,961        | ..... | 24,429 |
| 1961               | 324,050 | 139,804 | 104,027 | 12,046           | 1,144  | 3,676     | 6,714          | 6,006     | 4,873       | 5,124              | 4,595        | 468   | 35,573 |
| 1962               | 327,542 | 141,342 | 106,777 | 12,121           | 4,926  | 4,583     | 5,340          | 5,967     | 6,981       | 4,649              | 3,100        | 187   | 31,569 |
| 1963               | 336,787 | 150,920 | 97,095  | 10,659           | 9,672  | 5,378     | 7,379          | 6,330     | 10,484      | 4,740              | 2,216        | 266   | 31,648 |
| 1964               | 410,401 | 146,090 | 140,418 | 14,343           | 6,857  | 6,485     | 9,973          | 9,470     | 10,429      | 6,460              | 1,943        | 225   | 57,708 |
| 1965               | 556,402 | 191,422 | 206,054 | 21,544           | 10,161 | 7,830     | 11,894         | 12,259    | 13,694      | 6,269              | 4,421        | 4,171 | 66,683 |
| Percentage         |         |         |         |                  |        |           |                |           |             |                    |              |       |        |
| 1960               | 100     | 40.8    | 34.6    | 4.5              | 2.9    | 2.0       | 1.6            | 1.3       | 1.0         | 0.8                | 0.8          | ..... | 9.7    |
| 1961               | 100     | 43.2    | 32.1    | 3.7              | 0.3    | 1.1       | 2.1            | 1.9       | 1.5         | 1.6                | 1.4          | 0.1   | 11.0   |
| 1962               | 100     | 43.3    | 32.7    | 3.7              | 1.5    | 1.4       | 1.6            | 1.8       | 2.1         | 1.4                | 1.0          | 0.1   | 9.4    |
| 1963               | 100     | 44.8    | 28.8    | 3.2              | 2.9    | 1.6       | 2.2            | 1.9       | 3.1         | 1.4                | 0.6          | 0.1   | 9.4    |
| 1964               | 100     | 35.6    | 34.2    | 3.5              | 1.7    | 1.6       | 2.4            | 2.3       | 2.5         | 1.6                | 0.5          | 0.1   | 14.0   |
| 1965               | 100     | 34.4    | 37.0    | 3.9              | 1.8    | 1.4       | 2.1            | 2.2       | 2.5         | 1.1                | 0.8          | 0.8   | 12.0   |

Sources: Bank of Taiwan, CIECD.

<sup>1</sup> Note: Including bank's exchange settlements, U.S. aid & others.

Table 16. Imports of Principal Commodity Categories from Major Suppliers, 1965  
(U.S. \$ thousands, rounded)

| Category                     | Total         |         | United States |         | Japan   |        | Germany |                         | Other Major Suppliers |
|------------------------------|---------------|---------|---------------|---------|---------|--------|---------|-------------------------|-----------------------|
|                              | Value (\$000) | Value   | % Share       | Value   | % Share | Value  | % Share |                         |                       |
| Cotton piece goods           | 268           | 16      | 6             | 209     | 78      | 11     | 4       | None                    |                       |
| Raw cotton                   | 39,417        | 25,745  | 65            | 0       | 0       | 0      | 0       | Central America, Brazil |                       |
| Cotton yarn                  | 6             | 0       | 0             | 6       | 100     | 0      | 0       | None                    |                       |
| Cotton products              | 388           | 14      | 4             | 105     | 27      | 2      | 0       | Italy, Hong Kong        |                       |
| Linen & products             | 637           | 0       | 0             | 13      | 2       | 0      | 0       | Asia                    |                       |
| Wool & products              | 10,750        | 16      | 0             | 4,664   | 43      | 3      | 0       | Australia               |                       |
| Man-made fiber & products    | 19,861        | 1,338   | 7             | 18,047  | 91      | 4      | 0       | None                    |                       |
| Ores, metals & mfs.          | 90,596        | 25,098  | 28            | 50,039  | 55      | 985    | 1       | Australia, Malaysia     |                       |
| Machinery & tools            | 84,416        | 22,396  | 27            | 44,044  | 52      | 11,372 | 13      | Switzerland, U.K.       |                       |
| Electrical materials         | 26,928        | 9,235   | 34            | 16,895  | 63      | 75     | 1       | None                    |                       |
| Vehicles, vessels & parts    | 40,474        | 10,187  | 25            | 22,517  | 56      | 2,536  | 6       | U.K., Italy             |                       |
| Scientific instruments       | 7,402         | 2,527   | 34            | 3,747   | 51      | 346    | 5       | None                    |                       |
| Chemicals                    | 22,275        | 7,952   | 36            | 7,273   | 33      | 1,633  | 7       | Canada, U.K.            |                       |
| Chemical fertilizer          | 16,169        | 3,295   | 20            | 10,196  | 63      | 466    | 3       | Morocco, Canada         |                       |
| Paints & dyes                | 6,678         | 472     | 7             | 3,160   | 47      | 1,058  | 16      | Switzerland             |                       |
| Pharmaceuticals              | 15,759        | 2,571   | 16            | 6,553   | 41      | 2,182  | 14      | Italy, Switzerland      |                       |
| Synthetic resins & plastics  | 10,769        | 5,506   | 51            | 4,440   | 41      | 507    | 5       | None                    |                       |
| Oil, grease & wax            | 10,840        | 7,094   | 65            | 2,352   | 22      | 108    | 1       | Brazil, U.K.            |                       |
| Crude & fuel oils            | 24,933        | 3,106   | 12            | 0       | 0       | 0      | 0       | Iraq                    |                       |
| Resins & gums                | 607           | 216     | 36            | 52      | 9       | 0      | 0       | Asia, Sudan             |                       |
| Coal, pitch & tar            | 881           | 722     | 82            | 17      | 2       | 0      | 0       | None                    |                       |
| Gypsum, asbestos & mfs.      | 1,017         | 21      | 2             | 251     | 25      | 2      | 0       | Mexico, Canada          |                       |
| Stone, earth & mfs.          | 2,412         | 483     | 20            | 1,224   | 51      | 97     | 4       | None                    |                       |
| Logs & lumber                | 18,524        | 6       | 0             | 0       | 0       | 0      | 0       | Philippines, Malaysia   |                       |
| Paper & paper pulp           | 8,286         | 3,510   | 42            | 1,802   | 22      | 6      | 0       | Canada                  |                       |
| Rubber & products            | 6,487         | 1,706   | 26            | 886     | 14      | 32     | 1       | Malaysia, Singapore     |                       |
| Hide & leather               | 2,059         | 387     | 19            | 39      | 2       | 7      | 1       | Thailand                |                       |
| Straw, rattan & mat.         | 178           | 0       | 0             | 8       | 4       | 0      | 0       | Asia                    |                       |
| Hair, feathers, & bristles   | 138           | 47      | 34            | 17      | 12      | 0      | 0       | Asia                    |                       |
| Beans                        | 18,618        | 16,577  | 89            | 0       | 0       | 0      | 0       | Thailand                |                       |
| Sea products                 | 566           | 0       | 0             | 154     | 27      | 0      | 0       | Korea                   |                       |
| Food & drinks                | 878           | 478     | 54            | 87      | 10      | 0      | 0       | Asia                    |                       |
| Wheat & flour                | 35,955        | 27,420  | 76            | 14      | 0       | 0      | 0       | Australia, Canada       |                       |
| Edible oils                  | 1,228         | 1,170   | 95            | 0       | 0       | 1      | 0       | Norway                  |                       |
| Milk & products              | 6,362         | 1,367   | 21            | 1,515   | 24      | 3      | 0       | Australia, Netherlands  |                       |
| Fruits & nuts                | 1,225         | 4       | 0             | 211     | 17      | 0      | 0       | Asia                    |                       |
| Vegetables                   | 265           | 78      | 29            | 163     | 62      | 5      | 2       | Asia                    |                       |
| Tobacco & wines              | 4,903         | 4,031   | 82            | 2       | 0       | 0      | 0       | S. Africa               |                       |
| Books & maps                 | 616           | 176     | 29            | 329     | 53      | 4      | 1       | None                    |                       |
| Office requisites            | 641           | 78      | 12            | 356     | 56      | 43     | 7       | None                    |                       |
| Printing materials           | 204           | 43      | 21            | 134     | 66      | 7      | 3       | None                    |                       |
| Photographic equipment       | 3,536         | 612     | 17            | 1,982   | 56      | 49     | 1       | Hong Kong               |                       |
| Glassware, cutlery, utensils | 176           | 41      | 23            | 102     | 58      | 0      | 0       | U.K.                    |                       |
| Cosmetics & toiletries       | 6             | 0       | 0             | 6       | 100     | 0      | 0       | None                    |                       |
| Others                       | 10,922        | 4,565   | 42            | 2,442   | 22      | 0      | 0       | Miscellaneous           |                       |
| Total                        | 555,286       | 190,306 | 34            | 206,054 | 37      | 21,544 | 4       |                         |                       |

Source: Foreign Trade Quarterly.

**Table 17. Imports of Foodstuffs and Beverages, 1960-65**

(U.S. \$ thousands, rounded)

| Item   | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers              |
|--|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|----------------------------------|
| <b>Cereals</b> .....                             | 56,021        | + 49                         | 45,870               | + 30                              | 81                             |                                  |
| Rice .....                                       | 1,212         | - 33                         | 0                    | (a)                               | 0                              | Thailand                         |
| Wheat .....                                      | 27,944        | + 38                         | 24,390**             | + 21                              | 87                             | U.S., Australia, Canada          |
| Barley .....                                     | 451           | + 66                         | 0                    | (a)                               | 0                              | Thailand                         |
| Corn .....                                       | 4,068         | +4,630                       | 2,195*               | (a)                               | 54                             | U.S., Argentina, Brazil          |
| Bran .....                                       | 53            | (a)                          | 0                    | (a)                               | 0                              | Australia, Thailand              |
| Grains, n.e.s. ....                              | 13            | - 68                         | 0                    | (a)                               | 0                              | Japan                            |
| Soybeans .....                                   | 19,265        | + 35                         | 19,265               | + 35                              | 100                            | U.S.                             |
| Others beans .....                               | 1,981         | +296                         | 17                   | (a)                               | (c)                            | Thailand                         |
| Edible starch .....                              | 432           | +232                         | (b)                  | (a)                               | (c)                            | Thailand, Malaysia               |
| Malt .....                                       | 546           | + 73                         | 0                    | (a)                               | 0                              | Australia                        |
| Cereals, n.e.s. ....                             | 57            | - 47                         | (b)                  | (a)                               | (c)                            | Australia                        |
| <b>Meat and Fish</b> .....                       | 1,213         | +137                         | 165                  | (a)                               | 14                             |                                  |
| Live animals for food .....                      | 442           | (a)                          | 160                  | (a)                               | 36                             | Japan, U.S.                      |
| Fresh, dried, preserved meats .....              | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Asia                             |
| Cattle fish .....                                | 679           | +1,091                       | 0                    | (a)                               | 0                              | Korea                            |
| Fish, n.e.s. ....                                | 84            | - 68                         | 0                    | (a)                               | 0                              | Asia                             |
| <b>Dairy Products</b> .....                      | 5,090         | +142                         | 547                  | + 89                              | 11                             |                                  |
| Evaporated milk, cream .....                     | 264           | +474                         | (b)                  | (a)                               | (c)                            | Netherlands                      |
| Powdered milk .....                              | 4,557         | +134                         | 541*                 | + 89                              | 12                             | Australia, Netherlands, Japan    |
| Butter .....                                     | 245           | +135                         | (b)                  | (a)                               | (c)                            | Australia                        |
| Dairy products, n.e.s. ....                      | 25            | +400                         | (b)                  | (a)                               | (c)                            | Australia                        |
| <b>Fruits, Nuts &amp; Vegetables</b> .....       | 1,716         | + 75                         | 286                  | +767                              | 17                             |                                  |
| Apples .....                                     | 531           | +203                         | (b)                  | (a)                               | (c)                            | Korea, Japan                     |
| Currants, raisins .....                          | 279           | (a)                          | 269                  | (a)                               | 96                             | U.S.                             |
| Pears .....                                      | 63            | +174                         | (b)                  | (a)                               | (c)                            | Japan                            |
| Fresh or dried fruits, n.e.s. ....               | 72            | +500                         | (b)                  | (a)                               | (c)                            | Asia                             |
| Canned fruits, juices, jams .....                | 87            | (a)                          | (b)                  | (a)                               | (c)                            | Japan                            |
| Copra .....                                      | 557           | (a)                          | 0                    | (a)                               | 0                              | Malaysia, Indonesia, Philippines |
| Nuts, vegetables, n.e.s. ....                    | 126           | + 56                         | (b)                  | (a)                               | (c)                            | Asia                             |
| <b>Edible Oils and Fats</b> .....                | 674           | - 76                         | 648                  | - 17                              | 96                             |                                  |
| Bean oil .....                                   | 231           | - 87                         | 230                  | - 70                              | 99                             | U.S.                             |
| Oils, fats, of seeds, nuts, kernels, n.e.s. .... | 414           | (a)                          | 409**                | (a)                               | 99                             | U.S.                             |
| Animal oils and fats, n.e.s. ....                | 29            | + 16                         | (b)                  | (a)                               | (c)                            | Norway                           |
| <b>Spices and Food Additives</b> .....           | 317           | + 49                         | 0                    | (a)                               | 0                              |                                  |
| Sugar .....                                      | 70            | +268                         | 0                    | (a)                               | 0                              | Netherlands                      |
| Cassia lignea .....                              | 64            | + 68                         | 0                    | (a)                               | 0                              | Asia                             |
| Cinnamon .....                                   | 47            | +236                         | 0                    | (a)                               | 0                              | Asia                             |
| Cloves .....                                     | 33            | +230                         | 0                    | (a)                               | 0                              | Asia                             |
| Pepper .....                                     | 32            | +433                         | 0                    | (a)                               | 0                              | Malaysia                         |
| Spices, food additive, n.e.s. ....               | 72            | - 43                         | 0                    | (a)                               | 0                              | Asia                             |
| <b>Miscellaneous Foodstuffs</b> .....            | 409           | +460                         | 217                  | +210                              | 53                             |                                  |
| Yeast .....                                      | 200           | +263                         | 131                  | +147                              | 65                             | U.S., U.K.                       |
| Cocoa .....                                      | 52            | (a)                          | (b)                  | (a)                               | (c)                            | Netherlands                      |
| Coffee .....                                     | 82            | (a)                          | 40                   | (a)                               | 49                             | U.S., U.K.                       |
| Others, n.e.s. ....                              | 73            | +356                         | 40                   | +167                              | 54                             | U.S., U.K.                       |
| <b>Alcoholic beverages</b> .....                 | 136           | +353                         | 22                   | +340                              | 17                             | U.K. France, Germany             |

**Table 18. Imports of Tobacco and Manufactures, 1960-65**

(U.S. \$ thousands, rounded)

| Item   | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share<br>1965<br>percent | Principal<br>suppliers |
|--|---------------|------------------------------|----------------------|-----------------------------------|-------------------------------|------------------------|
| <b>Total</b> .....                               | 3,550         | +33                          | 2,939                | +11                               | 83                            |                        |
| Leaf tobacco .....                               | 3,525         | +32                          | 2,923**              | +10                               | 83                            | U.S., S. Africa        |
| Cigarettes and tobacco manufactures, n.e.s. .... | 27            | (a)                          | 16                   | (a)                               | 61                            | U.S., U.K.             |

**Key to Commodity Trade Tables (Tables 17-39)**

(a) = negligible imports in 1960

(b) = negligible imports in 1965

(c) = U.S. share of market negligible in 1965

\* = U.S. imports in 1965 partly AID-financed

\*\* = U.S. imports in 1965 largely AID-financed

Table 19. Imports of Ores and Base Metals, 1960-65

(U.S. \$ thousands, rounded)

| Item                              | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers    |
|-----------------------------------|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|------------------------|
| <b>Ores</b> .....                 | <b>1,846</b>  | <b>+233</b>                  | <b>0</b>             | <b>(a)</b>                        | <b>0</b>                       |                        |
| Iron ores .....                   | 363           | + 57                         | 0                    | (a)                               | 0                              | Malaysia               |
| Bauxite .....                     | 1,085         | +275                         | 0                    | (a)                               | 0                              | Malaysia               |
| Other metallic ores .....         | 397           | +1,626                       | 0                    | (a)                               | 0                              | Asia                   |
| <b>Non-ferrous Metals</b> .....   | <b>11,972</b> | <b>+180</b>                  | <b>1,176</b>         | <b>+128</b>                       | <b>10</b>                      |                        |
| Unworked aluminum .....           | 271           | (a)                          | 232                  | (a)                               | 85                             | U.S.                   |
| Aluminum sheets, plates .....     | 42            | +100                         | 36                   | (a)                               | 87                             | U.S.                   |
| Aluminum wire .....               | 76            | (a)                          | 51                   | (a)                               | 67                             | U.S., Japan            |
| Aluminum foil .....               | 44            | +240                         | (b)                  | (a)                               | (c)                            | Japan                  |
| Aluminum worked, n.e.s. ....      | 41            | - 41                         | 27                   | - 37                              | 65                             | U.S., Japan            |
| Brass bars, rods .....            | 200           | + 23                         | (b)                  | - 99                              | (c)                            | Japan                  |
| Brass sheets, plates .....        | 90            | +143                         | (b)                  | - 99                              | (c)                            | Japan                  |
| Brass tubes, fittings .....       | 452           | +183                         | (b)                  | (a)                               | (c)                            | Japan                  |
| Brass wire .....                  | 223           | + 85                         | (b)                  | (a)                               | (c)                            | Japan                  |
| Brass strips, bands .....         | 299           | +215                         | 13                   | (a)                               | (c)                            | Japan                  |
| Brass, worked, n.e.s. ....        | (b)           | - 99                         | 0                    | (a)                               | 0                              | Japan                  |
| Unworked copper .....             | 1,743         | + 35                         | 51                   | + 82                              | (c)                            | Japan                  |
| Copper bars, rods. ....           | 356           | - 12                         | (b)                  | - 99                              | (c)                            | Japan                  |
| Copper sheets, plates .....       | 397           | +868                         | (b)                  | (a)                               | (c)                            | Japan                  |
| Copper tubes, fittings .....      | 386           | +264                         | (b)                  | - 99                              | (c)                            | Japan                  |
| Copper wire .....                 | 1,712         | +500                         | 11                   | (a)                               | (c)                            | Japan, Korea           |
| Copper strips, bands .....        | 74            | +131                         | (b)                  | (a)                               | (c)                            | Japan                  |
| Copper, n.e.s. ....               | 11            | (a)                          | 0                    | (a)                               | 0                              | Japan                  |
| Unworked lead .....               | 1,075         | +240                         | 22                   | +214                              | (c)                            | Japan, Australia       |
| Worked lead, n.e.s. ....          | 51            | (a)                          | 18                   | (a)                               | 35                             | Japan, U.S.            |
| Unworked nickel .....             | 199           | +262                         | 28                   | +155                              | 14                             | Canada, Norway, U.S.   |
| Worked nickel, n.e.s. ....        | 50            | +179                         | 31                   | +182                              | 62                             | U.S., Japan            |
| Unworked tin .....                | 159           | (a)                          | (a)                  | (a)                               | (c)                            | Malaysia               |
| Unworked zinc .....               | 1,943         | +396                         | 266                  | (a)                               | 14                             | Japan, Australia, U.S. |
| Zinc sheets, plates .....         | 132           | + 27                         | 25                   | (a)                               | 19                             | Japan, U.S.            |
| Zinc, n.e.s. ....                 | 148           | (a)                          | 114                  | (a)                               | 77                             | U.S.                   |
| Non-ferrous metal scrap .....     | 853           | +1,346                       | 202                  | +156                              | 24                             | U.S., Hong Kong        |
| Non-ferrous metals, n.e.s. ....   | 196           | + 70                         | 20                   | (a)                               | 10                             | Japan, Australia       |
| <b>Iron and Steel</b> .....       | <b>66,419</b> | <b>+136</b>                  | <b>18,725</b>        | <b>+171</b>                       | <b>28</b>                      |                        |
| Unworked iron and steel .....     | 469           | - 2                          | 71                   | (a)                               | 15                             | Japan                  |
| Ungalvanized sheets, plates ..... | 14,433        | +241                         | 49*                  | - 80                              | (c)                            | Japan                  |
| Galvanized sheets .....           | 1,880         | + 7                          | (b)                  | (a)                               | (c)                            | Japan                  |
| Tinned plates, plain .....        | 9,194         | +188                         | 1,089**              | + 48                              | 12                             | Japan, U.S.            |
| Tinned plates, decorated .....    | 363           | (a)                          | 357                  | (a)                               | 99                             | U.S.                   |
| Angles .....                      | 192           | - 64                         | 0                    | -100                              | 0                              | Japan                  |
| Nail rods .....                   | 3,701         | +252                         | (b)                  | (a)                               | (c)                            | Japan                  |
| Unworked structural shapes .....  | 1,030         | - 6                          | (b)                  | - 99                              | (c)                            | Japan                  |
| Worked structural shapes .....    | 403           | + 76                         | 0                    | -100                              | 0                              | Japan                  |
| Pipes and fittings .....          | 3,755         | + 86                         | 933                  | +309                              | 25                             | Japan, U.S.            |
| Wire .....                        | 1,371         | + 85                         | 69                   | +475                              | (c)                            | Japan                  |
| Bands or strips .....             | 1,246         | +183                         | (b)                  | - 99                              | (c)                            | Japan                  |
| Castings and forging .....        | 143           | (a)                          | 0                    | (a)                               | 0                              | Japan                  |
| Hoops .....                       | 153           | + 25                         | 0                    | (a)                               | 0                              | Japan                  |
| Rails .....                       | 527           | - 83                         | (b)                  | - 99                              | (c)                            | Japan                  |
| Plate cuttings .....              | 543           | (a)                          | 379                  | (a)                               | 70                             | U.S.                   |
| Spring steel .....                | 335           | +182                         | (b)                  | (a)                               | (c)                            | Japan                  |
| Silicon steel .....               | 1,633         | +175                         | (b)                  | (a)                               | (c)                            | Japan, France          |
| Other tool steel .....            | 2,701         | +433                         | 313                  | +185                              | 11                             | Japan, U.S.            |
| Iron and steel scrap .....        | 22,038        | +188                         | 15,402               | +197                              | 70                             | U.S., Hong Kong, Japan |
| Iron and steel n.e.s. ....        | 239           | + 43                         | 13                   | (a)                               | (c)                            | Germany, Japan         |
| Ferro-alloys .....                | 72            | - 45                         | (b)                  | (a)                               | (c)                            | Japan, Germany         |

Key to Commodity Trade Tables (Tables 17-39)

(a) = negligible imports in 1960

(b) = negligible imports in 1965

(c) = U.S. share of market negligible in 1965

\* = U.S. imports in 1965 partly AID-financed

\*\* = U.S. imports in 1965 largely AID-financed

**Table 20. Imports of Miscellaneous Metal Manufactures, 1960-65**  
(U.S. \$ thousands, rounded)

| Item  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. Share,<br>1965<br>percent | Principal suppliers   |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|-----------------------|
| <b>Total</b> .....                                    | <b>4,752</b>  | <b>+113</b>                  | <b>557</b>           | <b>- 9</b>                        | <b>42</b>                      |                       |
| Netting, grill, fencing .....                         | 197           | + 59                         | (b)                  | (a)                               | (c)                            | Japan                 |
| Wire rope .....                                       | 325           | + 3                          | 62                   | (a)                               | 19                             | Germany, Japan, U.S.  |
| Transmission chains & parts .....                     | 529           | +286                         | 98                   | (a)                               | 18                             | Japan, U.S.           |
| Ball bearings, roller bearings, needle bearings ..... | 1,886         | +225                         | 136                  | + 17                              | 7                              | Japan                 |
| Steel balls .....                                     | 17            | - 50                         | 0                    | (a)                               | 0                              | Japan, Sweden, U.S.   |
| Metal containers .....                                | 795           | +526                         | 63                   | + 10                              | 8                              | Japan, Viet Nam, U.S. |
| Magnet blanks .....                                   | 136           | + 42                         | 13                   | (a)                               | 10                             | Japan                 |
| Welding rods .....                                    | 488           | +133                         | 82                   | +110                              | 17                             | Japan, U.S.           |
| Articles for binding & capping .....                  | 79            | (a)                          | 67                   | (a)                               | 85                             | U.S.                  |
| Crucible, moulds & parts .....                        | 145           | (a)                          | 12                   | (a)                               | 8                              | Japan                 |
| Metal manufactures, n.e.s. ....                       | 156           | +129                         | 19                   | + 46                              | 13                             | Japan                 |

**Table 21. Imports of Electrical Materials, 1960-65**  
(U.S. \$ thousands, rounded)

| Item  | Total        | Percent change | From U.S.  | U.S. percent change | U.S. Share | Principal suppliers |
|---|--------------|----------------|------------|---------------------|------------|---------------------|
| <b>Total</b> .....  | <b>3,828</b> | <b>+ 22</b>    | <b>589</b> | <b>- 26</b>         | <b>15</b>  |                     |
| Bulbs, tubes, arc lamps .....   | 227          | + 44           | 44         | +214                | 19         | Japan, U.S.         |
| Household switches, fixtures .....  | 84           | - 49           | (a)        | (a)                 | (c)        | Japan               |
| Insulated wire & cable solely for telecommunications use .....                                    | 392          |                | 74**       |                     | 19         | Japan               |
| Enameled wire, high tension insulated cable .....   | 840          | - 18           | 41         | - 71                | (c)        | Japan               |
| Insulated wire and cable, n.e.s. ....   | 134          |                | 37         |                     | 27         | Japan, U.S.         |
| Insulating materials, n.e.s. ....   | 587          | + 63           | 84         | +200                | 14         | Japan               |
| Electrical materials, fixtures & fittings for wiring, transmission, and distribution, n.e.s. .... | 885          | + 64           | 151        | - 35                | 17         | Japan, U.S.         |
| Batteries or cells .....  | 558          | +421           | 124        | +553                | 22         | Japan, U.S.         |
| Electrolytic condensers .....   | 120          | - 17           | 26         | (a)                 | 21         | Japan, U.S.         |

**Table 22. Imports of Machinery Equipment and Parts, 1960-65**

| Item  | Total         | Percent change | From U.S.     | U.S. percent change | U.S. Share | Principal suppliers                     |
|---|---------------|----------------|---------------|---------------------|------------|---|
| <b>Total</b> .....                          | <b>90,085</b> | <b>+ 62</b>    | <b>29,718</b> | <b>+ 46</b>         | <b>33</b>  |   |
| Farm, fishing machinery .....               | 409           | - 69           | (b)           | - 99                | (c)        | Japan                                   |
| Mining, excavation machinery .....          | 2,887         | - 3            | 1,223         | - 36                | 42         | U.S., Japan, Germany                    |
| Oil drilling & refining machinery .....     | 439           | + 32           | 307           | - 2                 | 70         | U.S.                                    |
| Sugar mfg., brewing machinery .....         | 338           | - 52           | 29            | + 61                | 9          | Japan, U.S., Germany                    |
| Dairy machinery .....                       | (b)           | (a)            | 0             | (a)                 | 0          | Japan, Europe                           |
| Flour mill machinery .....                  | 96            | (a)            | 0             | (a)                 | 0          | Switzerland                             |
| Tobacco processing machinery .....          | 574           | +504           | (b)           | - 99                | (c)        | Italy                                   |
| Sewing machinery .....                      | 971           | +150           | 52            | - 22                | 5          | Japan                                   |
| Knitting, embroidery machinery .....        | 1,645         | +434           | 36            | (a)                 | (c)        | Japan, Germany                          |
| Textile machinery .....                     | 16,026        | +258           | 938           | +200                | 6          | Japan, Germany, Switzerland, U.K., U.S. |
| Pulp, paper machinery .....                 | 1,789         | +271           | 451           | +1,510              | 25         | Japan, U.S., Germany                    |
| Printing, bookbinding machinery .....       | 347           | +133           | (b)           | (a)                 | (c)        | Japan                                   |
| Rubber manufacturing machinery .....        | 117           | - 39           | 0             | (a)                 | 0          | Japan                                   |
| Metalworking machinery .....                | 2,029         | +509           | 287           | +215                | 14         | Japan, Germany, U.S.                    |
| Lathes .....                                | 334           | + 85           | (b)           | - 99                | (c)        | Japan, Germany                          |
| Machine tools, parts, n.e.s. ....           | 1,393         | +187           | 147           | - 9                 | 11         | Japan, U.S., Germany                    |
| Machine shop tools .....                    | 1,110         | +130           | 165           | + 67                | 15         | Japan, U.S.                             |
| Hand tools, implements .....                | 2,302         | +103           | 231           | - 9                 | 10         | Japan, U.S.                             |
| Power generating machinery                  |               |                |               |                     |            |   |
| high voltage .....                          | 2,137         | - 64           | 350           | - 74                | 16         | Japan, U.S.                             |
| Parts for above .....                       | 3,282         | +301           | 367           | +120                | 11         | Japan, U.S.                             |
| Power generating machinery                  |               |                |               |                     |            |   |
| low voltage .....                           | 167           | + 13           | 23            | (a)                 | 14         | Japan                                   |
| Parts for above .....                       | 190           | +459           | 22            | (a)                 | 12         | Japan                                   |
| Internal combustion engines, parts .....    | 7,440         | + 67           | 1,482         | - 47                | 20         | Japan, U.S.                             |
| Steam engines, steam turbines, parts .....  | 15,398        | +854           | 15,283**      | +3,319              | 99         | U.S.                                    |
| Steam boilers, boiler house plant .....     | 202           | - 80           | 200**         | (a)                 | 99         | U.S.                                    |
| Boiler fittings, mountings .....            | 639           | - 44           | 329*          | +170                | 51         | U.S., Japan                             |
| Prime movers, n.e.s. ....                   | 3,526         | - 26           | 2,062         | - 53                | 58         | U.S., Japan                             |
| Pumps, pumping machinery .....              | 1,379         | + 73           | 1,046         | + 97                | 76         | U.S., Japan, Germany                    |
| Industrial refrigeration machinery .....    | 324           | + 89           | 43            | - 34                | 13         | Japan, U.S., Denmark                    |
| Industrial air conditioning machinery ..... | 707           | +470           | 551*          | +665                | 78         | U.S.                                    |
| Typewriters .....                           | 242           | +128           | 73            | + 83                | 30         | U.S., Europe                            |
| Copying machines .....                      | 137           | +389           | 26            | (a)                 | 19         | Japan, U.S.                             |
| Office machinery, n.e.s. ....               | 673           | +200           | 342           | +434                | 50         | U.S., Japan                             |
| Electric traffic control equipment .....    | 57            | - 79           | (b)           | - 99                | (c)        | Sweden, France                          |
| Machinery, n.e.s. ....                      | 20,773        | + 28           | 3,622         | - 40                | 17         | Japan, U.S., Germany                    |

**Table 23. Imports of Transport Equipment and Parts, 1960-65**  
(U.S. \$ thousands, rounded)

| Item  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers   |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|-----------------------|
| <b>Total</b> .....                          | <b>47,590</b> | <b>+151</b>                  | <b>6,862</b>         | <b>+ 76</b>                       | <b>14</b>                      |                       |
| Aircraft engines .....                      | 951           | +291                         | 951                  | +291                              | 100                            | U.S.                  |
| Aircrafts parts, n.e.s. ....                | 2,190         | +339                         | 2,129                | +330                              | 99                             | U.S.                  |
| Ships, boats .....                          | 19,548        | +311                         | 1,315                | +1,778                            | 7                              | Japan, U.K., U.S.     |
| Ship and boat materials, parts .....        | 90            | + 55                         | (b)                  | (a)                               | (c)                            | Japan                 |
| Railway rolling stock .....                 | 749           | - 33                         | 0                    | -100                              | 0                              | Japan                 |
| Railway materials, parts .....              | 765           | - 79                         | 296                  | - 83                              | 39                             | Japan, U.S.           |
| Sedan cars .....                            | 488           | +117                         | 202                  | +146                              | 41                             | U.S., Germany, Japan  |
| Station wagons .....                        | 100           | + 54                         | 20                   | - 50                              | 20                             | Japan, Germany        |
| Tractors, trailers .....                    | 28            | - 88                         | (b)                  | - 99                              | (c)                            | Japan                 |
| Trucks .....                                | 895           | - 3                          | 193                  | - 71                              | 22                             | Japan, U.S., Germany  |
| Ambulance, fire engines .....               | 105           | (a)                          | (b)                  | (a)                               | (c)                            | U.K.                  |
| Motorcycles, scooters .....                 | 2,750         | +115                         | (b)                  | (a)                               | (c)                            | Japan, Italy          |
| Motor vehicles, n.e.s. ....                 | 58            | + 49                         | (b)                  | (a)                               | (c)                            | Germany               |
| Mechanical handling vehicles .....          | 293           | +877                         | 123                  | (a)                               | 42                             | U.S., Japan           |
| Motor vehicle chassis .....                 | 4,378         | +236                         | 28                   | - 86                              | (c)                            | Japan                 |
| Starter motors, dynamos, parts .....        | 748           | +1,236                       | 33                   | +100                              | (c)                            | Japan                 |
| Electrical ignition equipment, parts .....  | 764           | +488                         | 97                   | + 37                              | 13                             | Japan, U.S.           |
| Electrical sound signaling equipment .....  | 204           | +271                         | 11                   | - 39                              | (c)                            | Japan                 |
| Electrical visual signaling equipment ..... | 558           | +1,760                       | 61                   | (a)                               | 11                             | Japan                 |
| Automotive vehicle parts, n.e.s. ....       | 7,799         | +123                         | 1,365                | + 31                              | 18                             | Japan, U.S., Germany  |
| Motorcycle parts .....                      | 3,875         | +540                         | (b)                  | (a)                               | (c)                            | Japan, Italy, Germany |
| Bicycles, parts .....                       | 244           | + 23                         | 0                    | (a)                               | 0                              | Japan, U.K.           |
| Vehicles and parts, n.e.s. ....             | 10            | (a)                          | (b)                  | (a)                               | (c)                            | Japan                 |

**Table 24. Imports of Communications Apparatus and Equipment, 1960-65**  
(U.S. \$ thousands, rounded)

| Item   | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U. S. share,<br>1965<br>percent | Principal suppliers  |
|--|---------------|------------------------------|----------------------|-----------------------------------|---------------------------------|----------------------|
| <b>Total</b> .....   | <b>17,798</b> | <b>+424</b>                  | <b>6,712</b>         | <b>+1,098</b>                     | <b>38</b>                       |                      |
| Radio, telephonic, telegraphic and<br>broadcasting apparatus .....   | 1,168         | +362                         | 784                  | +570                              | 67                              | U.S., Japan          |
| Radio receivers, TV apparatus radio facsimile<br>apparatus & microphone equipment .....  | 3,355         | +605                         | 169                  | +357                              | (c)                             | Japan                |
| Radar apparatus, hydrophones, radio remote<br>control app., radio beacons, radiosondes &<br>radio fish finders and other radio<br>navigation aid apparatus ..... | 281           | + 97                         | 220                  | (a)                               | 78                              | U.S., Japan          |
| Transistors, photoelectric cells, and<br>thermionic tubes or cold cathode tubes ....   | 2,520         | +388                         | 549                  | +326                              | 22                              | Japan, U.S.          |
| Hard rubber dials, Litzendraft-wire, grid<br>leak, microphones and similar equipment   | 2,340         | +194                         | 600                  | +838                              | 26                              | Japan, U.S.          |
| Buzzers, ABCD, battery eliminators sockets,<br>jacks, and similar equipment .....  | 90            | +246                         | 40                   | (a)                               | 44                              | Japan, U.S.          |
| Switches, lightning arresters, keys, coils &<br>antenna equipment .....  | 406           | +900                         | 85                   | (a)                               | 20                              | Japan, U.S.          |
| Other radio parts & accessories .....  | 2,831         | +2,202                       | 1,164                | +1,473                            | 41                              | Japan, U.S.          |
| Line telephonic & telegraphic apparatus ....   | 4,244         | +370                         | 3,000                | +2,532                            | 71                              | U.S., Japan          |
| Other telephonic & telegraphic apparatus ....  | 155           | + 5                          | 28                   | +155                              | 18                              | Germany, Japan, U.S. |
| Insulated wire & cable solely for<br>telecommunications .....  | 393           | (a)                          | 74**                 | (a)                               | 19                              | Japan, U.S.          |

**Table 25. Imports of Office Equipment and Supplies, 1960-65**  
(U.S. \$ thousands, rounded)

| Item                                      | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|---------------------|
| <b>Total</b> .....                        | <b>2,218</b>  | <b>+142</b>                  | <b>772</b>           | <b>+294</b>                       | <b>35</b>                      |                     |
| Typewriters .....                         | 242           | +128                         | 73                   | + 83                              | 30                             | U.S., Europe        |
| Copying machines .....                    | 137           | +390                         | 26                   | (a)                               | 19                             | Japan, U.S.         |
| Office machinery, n.e.s. ....             | 673           | +200                         | 349                  | +445                              | 52                             | U.S., Japan         |
| Office supplies of paper .....            | 209           | +808                         | 147                  | +880                              | 71                             | U.S., Japan         |
| Safes, cash boxes, vaults .....           | 115           | (a)                          | 63                   | (a)                               | 55                             | U.S., Japan         |
| Pen nibs .....                            | 40            | + 1                          | (b)                  | (a)                               | (c)                            | Japan               |
| Fountain pens, propelling pencils .....   | 289           | +143                         | 44                   | +175                              | 15                             | Japan, U.S.         |
| Pencils and other office requisites ..... | 271           | - 13                         | 19                   | - 54                              | 7                              | Japan               |
| Printing and lithographic materials ..... | 70            | +141                         | (b)                  | (a)                               | (c)                            | Japan               |
| Inks of all kinds .....                   | 170           | +359                         | 42                   | (a)                               | 25                             | Japan, U.S.         |



**Table 26. Imports of Building Material and Accessories, 1960-65**  
(U.S. \$ thousands, rounded)

| Item  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers    |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|------------------------|
| <b>Non-metallic structural materials</b> .....                    | <b>2,601</b>  | <b>+ 51</b>                  | <b>468</b>           | <b>+ 67</b>                       | <b>18</b>                      |                        |
| Pitch, asphalt .....  | 295           | +130                         | 265                  | (a)                               | 90                             | U.S.                   |
| Asbestos fiber .....  | 256           | + 23                         | (b)                  | (a)                               | (c)                            | Canada, S. Africa      |
| Asbestos sheets .....   | 181           | +108                         | 10                   | - 37                              | 6                              | Japan, U.K.            |
| Asbestos mfr., n.e.s. ....  | 119           | + 59                         | 10                   | - 37                              | 8                              | Japan                  |
| Cement .....  | 20            | - 96                         | 20                   | (a)                               | 100                            | U.S.                   |
| Fire bricks, clay .....   | 341           | + 48                         | 36                   | - 74                              | 11                             | Japan, U.S.            |
| Gypsum .....  | 467           | + 75                         | 0                    | (a)                               | 0                              | Mexico                 |
| Tiles .....   | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Germany                |
| Sand, earth & stone mfr., n.e.s. ....                             | 114           | - 44                         | 26                   | - 10                              | 23                             | Japan, U.S.            |
| Glass sheet, plate .....  | 32            | (a)                          | 0                    | (a)                               | 0                              | Belgium                |
| Lumber, plywood .....   | 145           | +530                         | (b)                  | (a)                               | (c)                            | Asia                   |
| Linoleum, floor coverings .....                                   | 19            | (a)                          | (b)                  | (a)                               | (c)                            | Hong Kong              |
| Paperboards .....   | 465           | +281                         | 85                   | (a)                               | 18                             | Japan, U.S.            |
| Wallpaper .....   | 144           | (a)                          | (b)                  | (a)                               | (c)                            | Japan                  |
| <b>Metallic structural materials</b> .....                        | <b>1,593</b>  | <b>+ 3</b>                   | <b>(b)</b>           | <b>- 99</b>                       | <b>(c)</b>                     |                        |
| Unworked iron & steel structural sections.....                    | 1,030         | - 6                          | (b)                  | - 99                              | (c)                            | Japan                  |
| Worked iron & steel structural sections.....                      | 403           | +117                         | 0                    | -100                              | 0                              | Japan                  |
| Prefabricated forms of base metals .....                          | 160           | - 44                         | (b)                  | (a)                               | (c)                            | Japan                  |
| <b>Fixtures &amp; fittings</b> .....                              | <b>346</b>    | <b>+ 97</b>                  | <b>78</b>            | <b>+359</b>                       | <b>23</b>                      |                        |
| Household plumbing and sanitary fixtures,<br>ceramic, metal ..... | 36            | +200                         | 26                   | (a)                               | 70                             | U.S.                   |
| Household electrical fixtures .....                               | 309           | + 90                         | 53                   | +279                              | 17                             | Japan                  |
| <b>Hardware</b> .....   | <b>251</b>    | <b>+ 11</b>                  | <b>56</b>            | <b>- 43</b>                       | <b>22</b>                      |                        |
| Bolts, nuts and nails .....                                       | 88            | - 15                         | 23                   | - 73                              | 26                             | Japan, U.S.            |
| Locks, padlocks .....   | 131           | + 36                         | 25                   | (a)                               | 19                             | Japan, Hong Kong, U.S. |
| Hardware, n.e.s. ....   | 33            | + 22                         | (b)                  | (a)                               | (c)                            | Japan                  |
| <b>Paints</b> .....   | <b>736</b>    | <b>+ 32</b>                  | <b>224</b>           | <b>- 39</b>                       | <b>30</b>                      |                        |
| Enamels, paints .....   | 75            | - 53                         | 19                   | - 87                              | 25                             | Japan, U.S., Germany   |
| Varnishes .....   | 189           | +108                         | 15                   | (a)                               | 8                              | Japan                  |
| Lacquers .....  | 172           | +588                         | 42                   | (a)                               | 24                             | Japan, U.S.            |
| Paints, n.e.s. ....   | 215           | - 20                         | 114                  | - 44                              | 53                             | U.S., Japan            |
| Glue .....  | 85            | +608                         | 33                   | (a)                               | 39                             | Japan, U.S.            |
| <b>Building materials, n.e.s.</b> .....                           | <b>24</b>     | <b>- 56</b>                  | <b>13</b>            | <b>- 50</b>                       | <b>51</b>                      | <b>U.S., Japan</b>     |

**Table 27. Import of Pulp and Paper, 1960-65**  
(U.S. \$ thousands, rounded)

| Item                                    | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|---------------------|
| <b>Pulp &amp; pulp materials</b> .....  | <b>6,216</b>  | <b>+190</b>                  | <b>3,419</b>         | <b>+330</b>                       | <b>55</b>                      |                     |
| Sulfite wood pulp .....                 | 5,155         | +141                         | 2,724*               | +243                              | 53                             | U.S., Canada        |
| Chemical wood pulp .....                | 41            | (a)                          | 0                    | (a)                               | 0                              | Japan               |
| Mechanical wood pulp .....              | (b)           | (a)                          | (b)                  | (a)                               | 100                            | U.S.                |
| Waste paper .....                       | 854           | (a)                          | 531                  | (a)                               | 62                             | U.S.                |
| Old newspaper & periodicals .....       | 159           | (a)                          | 158                  | (a)                               | 99                             | U.S.                |
| <b>Paperboard</b> .....                 | <b>465</b>    | <b>+281</b>                  | <b>85</b>            | <b>(a)</b>                        | <b>18</b>                      | <b>Japan, U.S.</b>  |
| <b>Paper &amp; paper products</b> ..... | <b>2,076</b>  | <b>+ 11</b>                  | <b>239</b>           | <b>+343</b>                       | <b>11</b>                      |                     |
| Coated paper .....                      | 590           | +199                         | 0                    | (a)                               | 0                              | Japan               |
| Printing & newsprinting paper .....     | (b)           | (a)                          | 0                    | (a)                               | 0                              | Japan               |
| Document paper .....                    | 23            | (a)                          | 0                    | (a)                               | 0                              | Japan               |
| Glascine paper & cellophane .....       | 213           | - 40                         | (b)                  | (a)                               | (c)                            | Japan               |
| Tissue paper .....                      | 242           | + 32                         | (b)                  | (a)                               | (c)                            | Japan, Norway       |
| Packing & wrapping paper .....          | 16            | (a)                          | 12                   | (a)                               | 77                             | U.S.                |
| Wallpaper .....                         | 144           | (a)                          | (b)                  | (a)                               | (c)                            | Japan               |
| Cigarette paper .....                   | 223           | - 18                         | 0                    | (a)                               | 0                              | France, Japan       |
| Office supplies of paper .....          | 209           | +808                         | 147                  | +880                              | 71                             | U.S., Japan         |
| Paper, n.e.s. ....                      | 101           | + 26                         | 23                   | (a)                               | 23                             | Japan, U.S.         |
| <b>Paperware</b> .....                  | <b>304</b>    | <b>+ 2</b>                   | <b>45</b>            | <b>+ 32</b>                       | <b>15</b>                      | <b>Japan, U.S.</b>  |

**Key to Commodity Trade Tables (Tables 17-39)**

(a) = negligible imports in 1960

(b) = negligible imports in 1965

(c) = U.S. share of market negligible in 1965

\* = U.S. imports in 1965 partly AID-financed

\*\* = U.S. imports in 1965 largely AID-financed

**Table 28. Imports of Wood Products, 1960-65**  
(U.S. \$ thousands, rounded)

| Item  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers   |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|-----------------------|
| <b>Total</b> .....                            | <b>17,721</b> | <b>+346</b>                  | <b>(b)</b>           | <b>-99</b>                        | <b>(c)</b>                     |                       |
| Hardwood logs .....                           | 17,375        | +393                         | 0                    | -99                               | 0                              | Philippines, Malaysia |
| Softwood logs .....                           | (b)           | -99                          | 0                    | -99                               | 0                              | Cambodia              |
| Timber, hardwood & softwood .....             | 28            | +3                           | (b)                  | -99                               | (c)                            | Asia                  |
| Teakwood .....                                | 47            | +46                          | 0                    | (a)                               | 0                              | Thailand              |
| Lumber, plywood, n.e.s. ....                  | 70            | -43                          | 0                    | -99                               | 0                              | Asia                  |
| Cork, cork sheet .....                        | 67            | -34                          | 0                    | (a)                               | 0                              | Portugal              |
| Wooden furniture .....                        | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Asia                  |
| Bamboo, rattan, coir, straw, manufactures.... | 130           | +465                         | (b)                  | (a)                               | (c)                            | Asia, France          |

**Table 29. Imports of Industrial Chemicals, 1960-65**  
(U.S., \$ thousands, rounded)

| Item                             | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers  |
|----------------------------------|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|----------------------|
| <b>Total</b> .....               | <b>32,131</b> | <b>+263</b>                  | <b>11,615</b>        | <b>+272</b>                       | <b>36</b>                      |                      |
| Sulfur .....                     | 4,989         | +1,400                       | 1,528                | +363                              | 31                             | Canada, U.S., Mexico |
| Mercury .....                    | 1,099         | +793                         | 319                  | +2,300                            | 29                             | Japan, U.S., Italy   |
| Elements, n.e.s. ....            | 42            | +110                         | (b)                  | (a)                               | (c)                            | Japan                |
| Carbolic acid .....              | 182           | +153                         | 12                   | -78                               | 7                              | Japan, Canada        |
| Acids, n.e.s. ....               | 453           | +51                          | 40                   | +122                              | 9                              | Japan                |
| Sodium nitrate .....             | 111           | +484                         | 0                    | (a)                               | 0                              | Japan, U.K.          |
| Sodium cyanide .....             | 146           | +64                          | (b)                  | (a)                               | (c)                            | U.K.                 |
| Sodium bichromate .....          | 90            | +50                          | 0                    | (a)                               | 0                              | Germany, Japan       |
| Sodium compounds, n.e.s. ....    | 170           | +254                         | 18                   | +157                              | 11                             | Japan, Germany       |
| Potassium chlorate .....         | 211           | -68                          | 210                  | -26                               | 99                             | U.S.                 |
| Potassium compounds, n.e.s. .... | 50            | -95                          | (b)                  | (a)                               | (c)                            | Japan                |
| Manganese dioxide .....          | 263           | +324                         | (b)                  | (a)                               | (c)                            | Japan                |
| Methyl alcohol .....             | 797           | +1,300                       | (b)                  | (a)                               | (c)                            | Japan                |
| Alkyl benzene .....              | 315           | +543                         | 0                    | -100                              | 0                              | Italy, Japan         |
| Phthalates .....                 | 2,209         | +219                         | 1,334*               | +269                              | 60                             | U.S., Japan, Germany |
| Synthetic resins .....           | 10,001        | +426                         | 4,832*               | +477                              | 48                             | U.S., Japan, Germany |
| Rubber accelerators .....        | 164           | +222                         | (b)                  | -99                               | (c)                            | Japan, Germany       |
| Rubber antioxidants .....        | 140           | +175                         | 13                   | (a)                               | 9                              | Japan                |
| Borax, crude, refined .....      | 203           | +97                          | 203                  | +97                               | 100                            | U.S.                 |
| Surface active agents .....      | 1,097         | +344                         | 178                  | +178                              | 16                             | Japan, U.S., Germany |
| Flotation reagents .....         | 27            | +350                         | 18                   | +200                              | 67                             | U.S.                 |
| Chemicals, n.e.s. ....           | 9,370         | +209                         | 2,894                | +321                              | 31                             | Japan, U.S., Germany |

**Table 30. Imports of Dyes, Pigments, Paints and Tanning Materials, 1960-65**  
(U.S. \$ thousands, rounded)

| Item  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers         |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|-----------------------------|
| <b>Total</b> .....                            | <b>7,136</b>  | <b>+131</b>                  | <b>522</b>           | <b>-27</b>                        | <b>7</b>                       |                             |
| Synthetic organic dyestuffs .....             | 3,220         | +175                         | 86                   | -32                               | (c)                            | Japan, Switzerland, Germany |
| Carbon blacks .....                           | 428           | +197                         | 61                   | -54                               | 14                             | Japan, U.S.                 |
| Chrome yellow .....                           | 79            | +139                         | (b)                  | (a)                               | (c)                            | Japan                       |
| Prussian blue .....                           | 57            | +119                         | 0                    | (a)                               | 0                              | Japan                       |
| Lithopone .....                               | 207           | +23                          | 0                    | (a)                               | 0                              | Netherlands, Belgium        |
| Titanium dioxide .....                        | 644           | +318                         | 40                   | -7                                | 6                              | Japan                       |
| Pigments, n.e.s. ....                         | 123           | +40                          | (b)                  | (a)                               | 0                              | Europe, Asia                |
| Enamels, paints .....                         | 75            | -53                          | 19                   | -88                               | 25                             | Japan, U.S., Germany        |
| Varnishes .....                               | 188           | +107                         | 15                   | +88                               | 8                              | Japan                       |
| Cellulose lacquers .....                      | 172           | +588                         | 42                   | +367                              | 24                             | Japan, U.S.                 |
| Stearine .....                                | 270           | +391                         | (b)                  | (a)                               | (c)                            | Japan, Australia            |
| Turpentine .....                              | 26            | +189                         | (b)                  | (a)                               | (c)                            | Japan                       |
| Shellac .....                                 | 93            | -21                          | (b)                  | (a)                               | (c)                            | India                       |
| Paints, paint materials, n.e.s. ....          | 215           | -20                          | 114                  | -44                               | 53                             | U.S., Japan                 |
| Inks of all kinds .....                       | 170           | +359                         | 42                   | +282                              | 25                             | Japan, U.S.                 |
| Mimosa extract .....                          | 160           | +27                          | (b)                  | (a)                               | (c)                            | S. Africa                   |
| Quebracho extract .....                       | 55            | +358                         | 0                    | (a)                               | 0                              | Argentina                   |
| Tanning materials, n.e.s. ....                | (b)           | (a)                          | 0                    | (a)                               | 0                              | Asia                        |
| Miscellaneous coloring materials, n.e.s. .... | 953           | +245                         | 97                   | +439                              | 10                             | Japan, Germany              |

**Table 31. Imports of Agricultural Chemicals, 1960-65**  
(U.S. \$ thousands, rounded)

| Item                                | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers   |
|-------------------------------------|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|-----------------------|
| <b>Fertilizer, total</b> .....      | <b>17,391</b> | <b>- 27</b>                  | <b>2,889</b>         | <b>+ 71</b>                       | <b>17</b>                      |                       |
| Ammonium sulfate .....              | 5,729         | - 59                         | 0                    | (a)                               | 0                              | Japan                 |
| Nitrogenous fertilizer .....        | 3,668         | + 71                         | 0                    | (a)                               | 0                              | Japan                 |
| Potassic fertilizer .....           | 4,260         | + 43                         | 2,515                | +167                              | 60                             | U.S., Canada, Germany |
| Phosphate rock .....                | 3,481         | +142                         | 152                  | (a)                               | (c)                            | Morocco               |
| Calcium phosphate .....             | 253           | +107                         | 222                  | + 85                              | 87                             | U.S.                  |
| <b>Others, total</b> .....          | <b>4,688</b>  | <b>+285</b>                  | <b>1,347</b>         | <b>+242</b>                       | <b>29</b>                      |                       |
| Insecticides .....                  | 3,214         | +228                         | 894*                 | +173                              | 28                             | Germany, U.S., Japan  |
| Fungicides .....                    | 944           | +483                         | 194                  | +411                              | 21                             | Japan, U.S., Germany  |
| Agricultural chemicals, n.e.s. .... | 780           | +900                         | 258                  | +821                              | 33                             | U.S., Japan           |

**Table 32. Imports of Medicines, Medical Equipment and Supplies, 1960-65**  
(U.S. \$ thousands, rounded)

| Item   | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers                   |
|--|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|---------------------------------------|
| <b>Medicines</b> .....                       | <b>13,892</b> | <b>+ 30</b>                  | <b>1,455</b>         | <b>- 16</b>                       | <b>10</b>                      |                                       |
| Antibiotics .....                            | 2,351         | + 21                         | 503                  | - 59                              | 21                             | Italy, U.S., Japan                    |
| Sulfa drugs .....                            | 840           | + 28                         | 16                   | + 45                              | (c)                            | Japan, Italy, Denmark                 |
| Vitamins .....                               | 912           | +188                         | 79                   | + 76                              | 9                              | Japan, Switzerland,<br>Italy, Germany |
| Serums, vaccines .....                       | 162           | +206                         | 77                   | + 75                              | 48                             | U.S., Japan                           |
| Plasma .....                                 | 180           | +143                         | (b)                  | (a)                               | (c)                            | Japan                                 |
| Chemical pharmaceuticals, n.e.s. ....        | 1,549         | + 86                         | 75                   | +295                              | 5                              | Japan, France                         |
| Chemical medicaments, n.e.s. ....            | 5,274         | + 24                         | 726                  | + 27                              | 14                             | Japan, U.S., Germany                  |
| Ginseng .....                                | 234           | - 11                         | (b)                  | (a)                               | (c)                            | Korea                                 |
| Crude medicinal substances, n.e.s. ....      | 2,389         | + 7                          | 0                    | (a)                               | 0                              | Asia                                  |
| <b>Medical equipment</b> .....               | <b>683</b>    | <b>+ 10</b>                  | <b>188</b>           | <b>+ 2</b>                        | <b>28</b>                      |                                       |
| Surgical, medical, instruments .....         | 621           | + 5                          | 185                  | + 1                               | 30                             | Japan, U.S.                           |
| Dental materials, n.e.s. ....                | 56            | +211                         | 0                    | (a)                               | 0                              | Japan                                 |
| Surgical & sanitary sundries of cotton ..... | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | U.S., U.K.                            |

**Table 33. Imports of Inedible Oils, Fats, Waxes, Resins and Gums, 1960-65**  
(U.S. \$ thousands, rounded)

| Item  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal<br>suppliers |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|------------------------|
| <b>Mineral oils</b> .....                           | <b>26,792</b> | <b>+ 20</b>                  | <b>2,241</b>         | <b>+ 3</b>                        | <b>8</b>                       |                        |
| Crude oil .....                                     | 22,117        | + 15                         | 0                    | (a)                               | 0                              | Iraq                   |
| Fuel oil .....                                      | 271           | (a)                          | 0                    | (a)                               | 0                              | Iraq                   |
| Transformer oil .....                               | 157           | + 27                         | 54                   | - 55                              | 34                             | Japan, U.S.            |
| Lubricating oil .....                               | 3,066         | + 37                         | 1,766                | - 1                               | 57                             | U.S., Japan            |
| Lubricating grease .....                            | 252           | + 33                         | 138                  | - 12                              | 55                             | U.S., Japan            |
| Minerals oils, n.e.s. ....                          | 629           | +511                         | 252                  | +168                              | 40                             | Japan, U.S.            |
| Paraffin wax .....                                  | 301           | + 59                         | 31                   | 0                                 | 10                             | Japan, U.S.            |
| <b>Essential oils</b> .....                         | <b>1,304</b>  | <b>+228</b>                  | <b>198</b>           | <b>+154</b>                       | <b>15</b>                      |                        |
| Flavoring essences .....                            | 410           | +168                         | 103                  | (a)                               | 25                             | Japan, U.K., U.S.      |
| Essential oils, n.e.s. ....                         | 894           | +265                         | 95                   | + 36                              | 11                             | Brazil, Japan          |
| <b>Vegetable &amp; animal oils &amp; fats</b> ..... | <b>4,825</b>  | <b>+ 92</b>                  | <b>4,628</b>         | <b>+171</b>                       | <b>96</b>                      |                        |
| Vegetable oils, fats, inedible .....                | 34            | (a)                          | 11                   | (a)                               | 32                             | Japan, U.S.            |
| Animal oils, fats, inedible .....                   | 4,545         | + 88                         | 4,529**              | +169                              | 99                             | U.S.                   |
| Soaps, detergents .....                             | 77            | (a)                          | 55                   | (a)                               | 71                             | U.S.                   |
| Waxes, n.e.s. ....                                  | 170           | +113                         | 34                   | +127                              | 20                             | Germany, U.S.          |
| <b>Resins &amp; gums</b> .....                      | <b>483</b>    | <b>+ 10</b>                  | <b>191</b>           | <b>- 28</b>                       | <b>39</b>                      |                        |
| Gum arabic .....                                    | 79            | +155                         | (b)                  | (a)                               | (c)                            | Sudan                  |
| Resin (colophony) .....                             | 286           | - 4                          | 182                  | - 26                              | 64                             | U.S.                   |
| Gums, resins, n.e.s. ....                           | 119           | + 11                         | (b)                  | (a)                               | (c)                            | Asia                   |

**Key to Commodity Trade Tables (Tables 17-39)**

(a) = negligible imports in 1960

(b) = negligible imports in 1965

(c) = U.S. share of market negligible in 1965

\* = U.S. imports in 1965 partly AID-financed

\*\* = U.S. imports in 1965 largely AID-financed

**Table 34. Imports of Textile Fibers and Semi-manufactures, 1960-65**  
(U.S. \$ thousands, rounded)

| Item   | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers                      |
|--|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|--|
| <b>Cotton</b> .....  | 36,654        | + 65                         | 23,543               | + 10                              | 64                             |  |
| Raw cotton .....   | 36,262        | + 67                         | 23,498               | + 10                              | 65                             | U.S., Central America,<br>Brazil, Mexico |
| Yarn .....   | (b)           | - 99                         | 0                    | (a)                               | 0                              | Japan                                    |
| Thread .....   | 100           | +113                         | (b)                  | (a)                               | (c)                            | Japan                                    |
| Waste .....  | 69            | +475                         | 40                   | (a)                               | 58                             | U.S., Hong Kong                          |
| Piece goods .....  | 216           | + 89                         | (b)                  | - 99                              | (c)                            | Japan                                    |
| <b>Other natural fibers</b> .....  | 638           | (a)                          | (b)                  | (a)                               | (c)                            |  |
| Raw jute .....   | 562           | (a)                          | 0                    | (a)                               | 0                              | Thailand                                 |
| Raw fibers, n.e.s. ....  | 43            | (a)                          | 0                    | (a)                               | 0                              | Philippines                              |
| Yarn, thread, piece goods, twine and cordage                                   | 33            | (a)                          | (a)                  | (a)                               | (c)                            | Hong Kong, Japan                         |
| <b>Wool</b> .....  | 11,878        | +292                         | 0                    | (a)                               | 0                              |  |
| Raw wool .....   | 6,037         | +1,209                       | 0                    | (a)                               | 0                              | Australia                                |
| Carded or combed wool .....  | 5,406         | +164                         | 0                    | (a)                               | 0                              | Japan, Australia                         |
| Waste .....  | 169           | + 90                         | 0                    | 0                                 | 0                              | Australia                                |
| Yarn, thread .....   | 168           | +155                         | 0                    | (a)                               | 0                              | New Zealand, Japan                       |
| Piece goods .....  | 99            | +607                         | 0                    | (a)                               | 0                              | Japan                                    |
| <b>Silk, all kinds</b> .....   | 32            | + 88                         | 0                    | (a)                               | 0                              | Japan                                    |
| <b>Made-made fibers</b> .....  | 19,992        | +448                         | 387                  | +198                              | (c)                            |  |
| Rayon, polysioic, cellulose acetate and<br>other artificial staple fiber ..... | 5,235         | +145                         | 0                    | -100                              | 0                              | Japan                                    |
| Polyamide, polyester, polyacrylic and<br>other synthetic staple fiber .....    | 4,340         | +215                         | 231                  | +285                              | (c)                            | Japan                                    |
| Synthetic multifilaments .....   | 9,028         | +946                         | 36                   | + 9                               | (c)                            | Japan                                    |
| Synthetic monofilaments .....  | 141           | +131                         | (b)                  | (a)                               | (c)                            | Japan                                    |
| Yarns .....  | 49            | - 57                         | 0                    | (a)                               | 0                              | Japan                                    |
| Thread .....   | 175           | (a)                          | 0                    | (a)                               | 0                              | Japan                                    |
| Piece goods .....  | 1,023         | (a)                          | 114                  | (a)                               | 11                             | Japan                                    |

**Table 35. Imports of Textile Apparel and Manufactures, 1960-65**  
(U.S. \$ thousands, rounded)

| Item                                  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers    |
|---------------------------------------|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|------------------------|
| <b>Total</b> .....                    | 1,932         | +203                         | 123                  | (a)                               | 6                              |                        |
| Cotton clothing apparel .....         | 12            | - 45                         | 12                   | (a)                               | 100                            | U.S.                   |
| Cotton manufactures, n.e.s. ....      | 61            | +259                         | 14                   | (a)                               | 23                             | Japan, Hong Kong, U.S. |
| Wool clothing, apparel .....          | 11            | (a)                          | 10                   | (a)                               | 93                             | U.S.                   |
| Wool blankets .....                   | 194           | +488                         | (b)                  | (a)                               | (c)                            | Italy                  |
| Wool manufactures, n.e.s. ....        | 35            | (a)                          | 13                   | (a)                               | 38                             | U.S., Japan            |
| Man-made clothing, apparel .....      | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Japan                  |
| Tire cord fabric, high tenacity ..... | 1,295         | +294                         | 0                    | (a)                               | 0                              | Japan                  |
| Man-made manufactures, n.e.s. ....    | 318           | +737                         | 69                   | (a)                               | 22                             | Japan                  |

**Table 36. Imports of Leather and Manufactures, 1960-65**  
(U.S. \$ thousand, rounded)

| Item                            | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers |
|---------------------------------|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|---------------------|
| <b>Total</b> .....              | 1,936         | + 56                         | 378                  | +135                              | 20                             |                     |
| Cow hides .....                 | 1,726         | + 51                         | 373                  | +141                              | 22                             | Thailand, U.S.      |
| Other hides .....               | 130           | +165                         | 0                    | (a)                               | 0                              | Hong Kong, Thailand |
| Upper leather .....             | 20            | - 55                         | (b)                  | (a)                               | (c)                            | Europe              |
| Leather, n.e.s. ....            | 23            | (a)                          | (b)                  | (a)                               | (c)                            | Japan               |
| Leatherware .....               | 19            | (a)                          | (b)                  | (a)                               | (c)                            | Japan, U.S.         |
| Skins, dressed, undressed ..... | 18            | (a)                          | 0                    | (a)                               | 0                              | Canada, Hong Kong   |

**Key to Commodity Trade Tables (Tables 17-39)**

(a) = negligible imports in 1960

(b) = negligible imports in 1965

(c) = U.S. share of market negligible in 1965

\* = U.S. imports in 1965 partly AID-financed

\*\* = U.S. imports in 1965 largely AID-financed

**Table 37. Imports of Rubber, Plastics and Manufactures, 1960-65**

(U.S. \$ thousands, rounded)

| Item                             | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers              |
|----------------------------------|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|----------------------------------|
| <b>Total</b> .....               | <b>6,591</b>  | <b>+ 35</b>                  | <b>1,273</b>         | <b>+ 67</b>                       | <b>19</b>                      |                                  |
| Natural rubber .....             | 3,491         | +117                         | 0                    | (a)                               | 0                              | Malaysia, Singapore,<br>Viet-Nam |
| Synthetic rubber .....           | 1,533         | +317                         | 504                  | + 58                              | 33                             | U.S., Japan, Malaysia            |
| Waste rubber .....               | 142           | (a)                          | 0                    | (a)                               | 0                              | Japan, Singapore                 |
| Tires, tubes .....               | 581           | - 64                         | 404                  | + 32                              | 70                             | U.S., Japan                      |
| Rubber manufactures, n.e.s. .... | 500           | +166                         | 226                  | +113                              | 45                             | Japan, U.S.                      |
| Plastic manufactures .....       | 394           | +405                         | 138                  | +393                              | 35                             | Japan, U.S.                      |

**Table 38. Imports of Household and Personal Effects, 1960-65**

(U.S. \$ thousands, rounded)

| Item   | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers |
|--|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|---------------------|
| <b>Total</b> .....   | <b>5,699</b>  | <b>+ 72</b>                  | <b>719</b>           | <b>+123</b>                       | <b>13</b>                      |                     |
| Furniture, metal, wood .....   | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Japan, U.S.         |
| Clocks .....   | 462           | + 84                         | (b)                  | (a)                               | (c)                            | Japan               |
| Watches .....  | 1,485         | - 24                         | (b)                  | (a)                               | (c)                            | Japan               |
| Clock and watch parts .....  | 192           | +200                         | (b)                  | (a)                               | (c)                            | Japan, Switzerland  |
| Non-electric appliances .....  | 34            | +183                         | 10                   | - 17                              | 30                             | U.S., Japan         |
| Electric refrigerators .....   | 141           | +327                         | 74                   | +139                              | 53                             | U.S., Japan         |
| Refrigerator parts .....   | 1,907         | (a)                          | 236                  | (a)                               | 12                             | Japan, U.S.         |
| Electric air conditioners, parts ..                                    | 102           | +209                         | 66                   | +184                              | 65                             | U.S., Japan         |
| Lamps, lampware .....  | 81            | - 10                         | 43                   | + 10                              | 54                             | U.S., Japan         |
| Electric appliances, n.e.s. ....                                       | 166           | + 84                         | 38                   | - 3                               | 23                             | Japan, U.S.         |
| Water meters, parts .....  | 257           | + 49                         | 25                   | - 73                              | 10                             | Japan, U.K., U.S.   |
| Electricity meters and parts .....                                     | 305           | +392                         | 79                   | +126                              | 26                             | Japan, U.S.         |
| Cutlery, utensils, earthenware, pottery,<br>stoneware, chinaware ..... | 118           | - 23                         | 16                   | (a)                               | 14                             | Japan, U.K.         |
| Decorative, ornamental materials, n.e.s. ....                          | 36            | + 29                         | 0                    | (a)                               | 0                              | Japan               |
| Luggage, jewel boxes and similar items .....                           | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Japan, Hong Kong    |
| Eye glasses, binoculars .....  | 387           | +265                         | 104                  | (a)                               | 27                             | Japan, U.S.         |
| Toiletries .....   | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Japan               |
| Jewelry .....  | (b)           | (a)                          | (b)                  | (a)                               | (c)                            | Japan               |

**Table 39. Imports of Selected Leisure Time Products, 1960-65**

(U.S. \$ thousands, rounded)

| Item  | Total<br>1965 | Percent<br>change<br>1960-65 | From<br>U.S.<br>1965 | U.S. percent<br>change<br>1960-65 | U.S. share,<br>1965<br>percent | Principal suppliers        |
|---|---------------|------------------------------|----------------------|-----------------------------------|--------------------------------|----------------------------|
| <b>Total</b> .....                          | <b>8,609</b>  | <b>+202</b>                  | <b>1,087</b>         | <b>+ 92</b>                       | <b>13</b>                      |                            |
| Pianos .....                                | 245           | +271                         | (b)                  | (a)                               | (c)                            | Japan                      |
| Musical instruments, n.e.s. ....            | 93            | +258                         | (b)                  | (a)                               | (c)                            | Japan                      |
| Sporting requisites, toys, games .....      | 72            | +132                         | (b)                  | (a)                               | (c)                            | Japan                      |
| Radio, television receivers .....           | 3,355         | +603                         | 168                  | +354                              | (5)                            | Japan                      |
| Record players, tape recorders .....        | 255           | + 89                         | 58                   | + 14                              | 23                             | Japan, U.S.                |
| Parts for record players and tape recorders | 790           | + 56                         | 15                   | + 60                              | 10                             | Japan, U.K., Germany, U.S. |
| Image projectors, parts .....               | 44            | + 52                         | 15                   | (a)                               | 34                             | Japan, U.S.                |
| Photo cameras, lenses, parts .....          | 395           | + 63                         | (b)                  | (a)                               | (c)                            | Japan                      |
| Photo plates, paper, film .....             | 929           | +132                         | 199                  | +216                              | 21                             | Japan, U.S.                |
| Photo apparatus, n.e.s. ....                | 81            | + 14                         | 15                   | - 21                              | 18                             | Japan, U.S.                |
| Cine projection apparatus, parts .....      | 109           | + 85                         | (b)                  | (a)                               | (c)                            | Japan                      |
| Movie films, unexposed .....                | 336           | +178                         | 129                  | + 45                              | 38                             | U.S., Japan, Canada        |
| Movie films, developed .....                | 1,252         | +313                         | 223                  | + 84                              | 18                             | Japan, Hong Kong, U.S.     |
| Movie apparatus, materials, n.e.s. ....     | 83            | +118                         | 78                   | +388                              | 95                             | U.S.                       |
| Books .....                                 | 214           | + 75                         | 19                   | - 46                              | 9                              | Japan                      |
| Charts, maps .....                          | 22            | + 69                         | (b)                  | (a)                               | (c)                            | U.S., Japan                |
| Newspapers, periodicals .....               | 332           | + 57                         | 73                   | +564                              | 39                             | Japan, Hong Kong           |



# Specialized Listings

## *Republic of China Representation in the United States*

The Government of the Republic of China maintains diplomatic relations with nearly 60 countries. Names and addresses of Chinese diplomatic and consular missions in the United States are listed below.\* Also listed are commercial offices which various Chinese Government agencies maintain in the United States.

### **Diplomatic and Consular Missions in the United States:**

Chinese Embassy  
2311 Massachusetts Ave., N.W.  
Washington, D.C. 20008

Permanent Mission of the Republic of China  
to the United Nations  
235 East 42nd St., Suite 705  
New York, N.Y. 10017

Chinese Consulate-General  
551 Montgomery St.  
San Francisco, Cal. 94111

Chinese Consulate-General  
Room 517, Pershing Square Bldg.  
445 S. Hill St.  
Los Angeles, Cal. 90013

Chinese Consulate-General  
2746 Pali Highway  
Honolulu, Hawaii 96817

Chinese Consulate-General  
30 Rockefeller Plaza  
New York, N.Y. 10020

Chinese Consulate-General  
205 West Wacker Drive  
Chicago, Ill. 60606

Chinese Consulate-General  
Room 240 World Trade Bldg.  
1520 Texas Ave.  
Houston, Tex. 77002

Chinese Consulate-General  
415 Lyon Bldg.  
607 Third Ave.  
Seattle, Wash. 98104

### **Chinese Commercial Offices in the United States:**

Office of the Economic Counselor  
Chinese Embassy  
2311 Massachusetts Ave., N.W.  
Washington, D.C. 20008

Chinese Investment and Trade Office  
515 Madison Ave.  
New York, N.Y. 10022

Central Trust of China  
61 Broadway  
New York, N.Y. 10004

Central Trust of China  
510 W. 6th St., Room 1224  
Los Angeles, Cal. 90014

Bank of China  
40 Wall St.  
New York, N.Y. 10005

Bank of China  
225 Park Row  
New York, N.Y. 10038

\* Visas for travel to Taiwan may be obtained from any of the missions listed.

## ***Principal Banks in Taiwan***

### **Name and Address**

Central Bank of China  
21 Pao Ching Rd., Taipei

Bank of Taiwan  
120 Chungking South Rd., Sec. 1, Taipei

Bank of China  
15 Chungshan North Rd., Sec. 2, Taipei

Bank of Communications  
39 O Mei St., Taipei

Central Trust of China  
49 Wuchang St., Sec. 1, Taipei

Postal Remittance and Savings Bank  
43-45 Kaifeng St., Sec. 1, Taipei

China Development Corporation  
181-5 Chungshan North Rd., Sec. 2, Taipei

Land Bank of Taiwan  
25 Hsiang Yang Rd., Taipei

Cooperative Bank of Taiwan  
75-1 Kuan Chien Rd., Taipei

Mutual Loans and Savings Association  
32 Hwaining St., Taipei

Overseas Chinese Commercial Banking Corp.  
102 Henyang Rd., Taipei

First Commercial Bank  
30 Chungking South Rd., Sec. 1, Taipei

Hua Nan Commercial Bank  
38 Chungking South Rd., Sec. 1, Taipei

Chang Hwa Commercial Bank  
38 Tsuyu Rd., Sec. 2, Taichung

Shanghai Commercial and Savings Bank  
71 Kuan Chien Rd., Taipei

Nippon Kangyo Bank  
35 Poai Rd., Taipei

First National City Bank  
18 Kuan Chien Rd., Taipei

Bank of America  
43 Kuan Chien Rd., Taipei

Bangkok Bank  
24 Chungshan North Rd., Sec. 2, Taipei

## ***U.S. Department of Commerce Field Offices***

Albuquerque, N. Mex., 87101  
U.S. Courthouse  
Area Code 505 Tel. 247-0311

Anchorage, Alaska, 99501  
306 Loussac-Sogn Building  
Area Code 907 Tel. 272-6331

Atlanta, Ga., 30303  
4th Floor Home Savings Building  
75 Forsyth St., N.W.  
Area Code 404 Tel 526-6000

Baltimore, Md., 21202  
305 U.S. Courthouse, Gay and Lombard Sts.  
Area Code 301 Tel Plaza 2-8460

Birmingham, Ala., 35205  
Suite 200-201, 908 South 20th St.  
Area Code 205 Tel. 325-3327

Boston, Mass., 02203  
Room 510, John Fitzgerald Kennedy Federal Bldg.  
Area Code 617 Tel CA 3-2312

Buffalo, N.Y., 14203  
504 Federal Building, 117 Ellicott St.  
Area Code 716 Tel. 842-3208

Charleston, S.C., 29403  
Federal Building—Suite 631, 334 Meeting St.  
Area Code 803 Tel. 747-4171

Charleston, W.Va., 25301  
3002 New Federal Office Building, 500 Quarrier St.  
Area Code 304 Tel. 343-6196

Cheyenne, Wyo., 82001  
6022 Federal Building, 2120 Capitol Ave.  
Area Code 307 Tel. 634-5920

Chicago, Ill., 60604  
1486 New Federal Building, 219 South Dearborn St.  
Area Code 312 Tel. 828-4400

Cincinnati, Ohio, 45202  
8028 Federal Office Building, 550 Main St.  
Area Code 513 Tel. 684-2944

Cleveland, Ohio, 44101  
4th Floor, Federal Reserve Bank Building  
East 6th St. and Superior Ave.  
Area Code 216 Tel. 241-7900

Dallas Tex., 75202  
Room 1200, 1114 Commerce St.  
Area Code 214 Tel. Riverside 9-3287

Denver, Colo., 80202  
16407 Federal Building, 20th and Stout Sts.  
Area Code 303 Tel. 297-3246

Des Moines, Iowa, 50309  
1216 Paramount Building, 509 Grand Ave.  
Area Code 515 Tel. 284-4222

Detroit, Mich., 48226  
445 Federal Building  
Area Code 313 Tel. 226-6088

Greensboro, N.C., 27402  
412 U.S. Post Office Building  
Area Code 919 Tel. 275-9111

Hartford, Conn., 06103  
18 Asylum St.  
Area Code 203 Tel. 244-3530

Honolulu, Hawaii, 96813  
202 International Savings Building, 1022 Bethel St.  
Tel. 588-977



Houston, Tex., 77002  
 5102 Federal Building, 515 Rusk Ave.  
 Area Code 713 Tel. 228-0611

Jacksonville, Fla., 32202  
 512 Greenleaf Building, 208 Laura St.  
 Area Code 904 Tel. 354-7111

Kansas City, Mo., 64106  
 Room 2011, 911 Walnut St.  
 Area Code 816 Tel. FR. 4-3141

Los Angeles, Calif., 90015  
 Room 450, Western Pacific Building  
 1031 South Broadway  
 Area Code 213 Tel. 688-2833

Memphis, Tenn., 38103  
 345 Federal Office Building, 167 North Main St.  
 Area Code 901 Tel. 534-3214

Miami, Fla., 33130  
 928 Federal Office Building, 51 S.W. First Ave.  
 Area Code 305 Tel. 350-5267

Milwaukee, Wis., 53203  
 Straus Building, 238 West Wisconsin Ave.  
 Area Code 414 Tel. BR. 2-8600

Minneapolis, Minn., 55401  
 306 Federal Building, 110 South Fourth St.  
 Area Code 612 Tel. 334-2133

New Orleans, La., 70130  
 909 Federal Office Building, South 610 South St.  
 Area Code 504 Tel. 527-6546

New York, N.Y., 10001  
 61st Floor, Empire State Building, 350 Fifth Ave.  
 Area Code 212 Tel. Longacre 3-3377

Philadelphia, Pa., 19107  
 Jefferson Building, 1015 Chestnut St.  
 Area Code 215 Tel. 597-2850

Phoenix, Ariz., 85025  
 5413 New Federal Building, 230 North First Ave.  
 Area Code 602 Tel. 261-3285

Pittsburgh, Pa., 15222  
 2201 Federal Building, 1000 Liberty Ave.  
 Area Code 412 Tel. 644-2850

Portland, Oreg., 97204  
 217 Old U.S. Courthouse, 520 S.W. Morrison St.  
 Area Code 503 Tel. 226-3361

Reno, Nev., 89502  
 2028 Federal Building, 300 Booth St.  
 Area Code 702 Tel. 784-5203

Richmond, Va., 23240  
 2105 Federal Building, 400 North 8th St.  
 Area Code 703 Tel. 649-3611

St. Louis, Mo., 63103  
 2511 Federal Building, 1520 Market St.  
 Area Code 314 Tel. MA. 2-4243

Salt Lake City, Utah, 84111  
 3235 Federal Building, 125 South State St.  
 Area Code 801 Tel. 524-5116

San Francisco, Calif., 94102  
 Federal Building, Box 36013, 450 Golden Gate Ave.  
 Area Code 415 Tel. 556-5864

Santurce, P.R., 00907  
 Room 628, 605 Condado Ave.  
 Phone 723-4640

Savannah, Ga., 31402  
 235 U.S. Courthouse and Post Office Building  
 125-29 Bull St.  
 Area Code 912 Tel. 232-4321

Seattle, Wash., 98104  
 809 Federal Office Building, 909 First Ave.  
 Area Code 206 Tel. 583-5615

### ***Raw Materials Permitted Duty-free Entry and Storage in Bonded Warehouses***

- Wood for sawmill use
- Logs for plywood manufacture
- Scrap iron for steel bar manufacture
- Steel hoops, strips, sheets and zinc for making galvanized steel pipe and sheet
- Jute for making bags
- Textiles for making garments
- Thread for making fishing nets
- Wool for making wool tops
- Materials for making plastic flowers
- Parts and components for assembling radios
- Animal or plant oil for refining
- Wheat for processing into flour
- Starch for making monosodium glutamate

### ***Products Affected by AID Phase-Out***

Taiwan's imports of the following U.S. products were partially or (where indicated by an asterisk) largely financed with U.S. aid in 1964. The phase-out of the AID program has exposed them all to worldwide competition, since they are now mainly purchased with the Chinese Government's own foreign exchange on an untied basis. Accordingly, U.S. suppliers may have to intensify their sales promotion efforts in order to maintain their shares of the market for these commodities.

The phaseout does not apply to U.S. surplus agricultural commodities supplied under P.L. 480.

#### ***Machinery equipment and parts***

Farm and fishing machinery\*, high voltage power generating machinery, steam engines and turbines\*, steam boilers and boiler house plants\*, boiler fittings and mountings\*, internal combustion engines, motors (1 h.p. to 10 h.p.), construction machinery, metal working machinery, pumping machinery, open type

radial compressor units, scientific instruments, and miscellaneous machinery items, n.e.s.

#### *Vehicles and parts*

Trucks, motor vehicle chassis\*, vehicle parts, and railroad materials.

#### *Metals and manufactures*

Tin plate\*, ungalvanized iron and steel plate, tool steel, and other special steels, steel pipes and fittings\*, mild steel arc welding electrodes, wire rope of iron or steel, bolts, nuts, washers, nails, rivets, screws, spikes, tacks and the like, and prefabricated building forms of iron or steel\*.

#### *Electrical and electronic materials and components*

Electric conduit, electricity meters and parts\*, radio parts, TV picture tubes over 17", and loudspeakers.

#### *Chemicals*

Borax\*, catalyst for mineral oil refining\*, synthetic resins and plastics, carbon blacks, varnishes, insecticides and fungicides, calcium phosphate\*, phosphate rock, and miscellaneous chemicals.

#### *Miscellaneous raw materials*

Sulfite wood pulp, cow-hides and leather, synthetic rubber and rubber products, and lubricating oil.

### ***Imports Restricted to End-Users***

The following commodities may only be imported by end-users: carbon rod, television parts, system telephone (including series automatic system telephone), edible animal gelatine (including canned or in any other packing), L-threonine, L-phenyl alanine, L-tryptophane, DL-valine, L-valine, L-methionine, isoleucine, three kinds of pesticides (parathion, malathion, and endrin [94% minimum]), pyrethrin, red-phosphorous, daltoce T56 and B56, L-arginine HCL, L-aspartic acid potassium salt, L-aspartic acid magnesium salt, raw material for anti-biotics, corn starch amize (acid or alkaline to litmus), cotton seed flour, filter pipe or filter tube or carbon rod for brake shoe use, polyethylene film cutting, celluloid plate (x-ray film sheet scrap), gelatine for industrial use, and gelatine hectograph.

### ***Imports by State Only***

The following list of commodities may only be imported by the Central Trust of China and/or the Taiwan Supply Bureau:

**Chemicals and their raw materials**—latex, resin, borax, soda ash, sodium bicarbonate, fatty acid, stearine, menthol, menthol oil, aluminum sulfate, lithopone, cocoa powder, potassium chloride (not for fertilizer), castor oil;

**Metals**—Iron and steel scrap, steel ingot, steel plate, black sheet, tinplate, silicon steel sheet, gal-

vanized sheet, galvanized iron wire, iron angle, iron channel and I beam, cast iron pipe, steel pipe, tin, aluminum, zinc, electrolytic copper and copper ingot, copper rod, tube and wire, nickel, antimony;

**Food**—barley, wheat flour, bean oil, peanut oil, milk powder, green bean, red bean, salted fish;

**Textiles**—cotton, cotton yarn, artificial silk, artificial cotton, rayon yarn, woolen lining;

**Machinery and parts**—textile equipment and parts, electric welding rods, carbon rods, graphite electrodes, bicycle parts;

**Others**—crude oil, fertilizer and its raw material, beef tallow, coconut oil, timber, leather, glass, tires, motor vehicles, cement, and fire resistant materials.

### ***Imports Requiring Special Procedures***

**Transformers used in fluorescent lamps**—A safety certificate issued by the Taiwan Provincial Bureau of Inspection and Quarantine.

**Sewing machines for industrial use**—A certificate to the effect of industrial use issued by the Taiwan Provincial Department of Reconstruction. The import must be applied for by an agent representing the brand or brands.

**Textile spindles**—The import must be applied for by users at the export processing department of FETC.

**Whole sets of machinery**—No private traders are qualified for application. If a set of machinery is worth more than US\$500, the user, a factory or a plant, must apply for the import with approval of the Taiwan Provincial Department of Reconstruction.

**Motorcycles**—Only parts for maintenance purposes can be applied for. No approval will be given to parts that can be assembled for sale as complete sets.

**Watches and clocks**—If made in Switzerland and imported from Hong Kong, a certificate of origin issued by the original manufacturer or the chamber of commerce in Kowloon or Hong Kong is required.

**Plugs, sockets, switches and receptacles**—A safety certificate issued by the Taiwan Provincial Bureau of Inspection and Quarantine.

**Seeds**—A certificate by the Taiwan Provincial Department of Agriculture and Forestry to the effect that they are suitable for Taiwan.

**Potatoes**—Limited to seeds; and imports must be handled by the Central Trust of China, a government trading agency.

**Wheat**—Only applicable by end-users under U.S. aid or government foreign exchange quota.

**Corn**—Imports must be handled by the Taiwan Supply Bureau.

**Milk powder**—Quotations must be issued by local agents.

**Raw materials for making insecticides**—Only qualified factories can make application.

**Insecticides (finished products)**—For farm use a certificate by the Taiwan Provincial Department of Agriculture and Forestry, for household use a certificate from the Ministry of the Interior.

**Sodium Chloride (pure salt)**—Approval must be sought from the Salt Administration of the Ministry of Finance.

**Chemicals used in preparing food**—Approval must be sought from the Ministry of the Interior.

**Pharmaceuticals**—Permit issued by the Ministry of the Interior.

**Pharmaceutical for veterinary use**—Permit issued by the Taiwan Provincial Department of Agriculture and Forestry.

**Books and magazines in foreign languages**—Permit issued by the Ministry of the Interior.

**Chicken**—A quarantine certificate issued by the government authority in the country of origin.

**Snake skin**—Only imports from Hong Kong are permitted. A certificate of origin issued by the chamber of commerce in Hong Kong or Kowloon is necessary.

**Binoculars**—Only those of 20-power or higher can be imported, with approval from the Ministry of National Defense.

**Ampoules of 5 c.c. or smaller and hypodermic needles of No. 20 and larger**—A permit issued by the Taiwan Provincial Department of Health.

**Feeds**—A permit issued by the Taiwan Provincial Department of Agriculture and Forestry.

**Tin plate, dehydrated butter, non-fat milk powder, butter, phosphorous ores**—Only imports financed by U.S. aid will be approved.

### *Central and Provincial Gov't. Enterprises*

#### DIRECTLY OPERATED ENTERPRISES

**Industry**—Taiwan Sugar Corp., Taiwan Fertilizer Co., Taiwan Alkali Co., Taiwan Machinery Manufacturing Corp., Taiwan Textile Industrial Corp., Taiwan Aluminum Corp., Chungwa Machinery & Engineering Co., Taiwan Salt Processing Plant, General Salt Administration, MOF., Kaohsiung Ammonium Sulfate Corp., Taiwan Chung Hsin Paper & Pulp Corp.

**Mining**—China Petroleum Corp., Taiwan Metal Mining Corp., China Coal-Mining Developing Co.

**Electricity Supply**—Taiwan Power Co.

**Banking**—Central Bank of China, Bank of China, Bank of Communications, Farmers' Bank of China, Central Trust of China, Reinsurance Fund, Bank of

Taiwan, Land Bank of Taiwan, The First Commercial Bank of Taiwan, Hua-nan Commercial Bank, Chang-hua Commercial Bank, The Co-operative Bank of Taiwan, Taiwan Mutual Loan & Savings Co.

**Communications & Transportation**—Directorate-General of Post Office, MOC, Head Office of Telecommunications, MOC, China Merchants Steam Navigations Co., New China Salvage Co., Taiwan Railway Admin., Taiwan Highway Bureau, Taiwan Navigation Corp., Keelung Harbour Bureau, Kaohsiung Harbour Bureau, Taiwan Railway Freight Handling Co.

**Forestry**—Forestry Admin., Tahsueh Shan Forestry Corp.

**Miscellaneous**—Pharmaceutical Supply Bureau, MOI, Narcotics Supply Bureau, MOI, China Fishery Co., Joint Industrial Research Center, MOEA, Taiwan Supply Bureau, Taiwan Coal Supply Adjustment Committee, Taiwan Shin Sheng Pao Co., Taiwan Book Co., Taiwan Provincial Printing Press, Kaohsiung Industrial Water Supply Works, Chung Hsin Villa Water Works, Taiwan Agricultural & Industrial Enterprise Corp.

#### INDIRECTLY OPERATED ENTERPRISES

National Mint, Central Printing Factory, China Insurance Co., China Products Trading Co., Yung Shing Industrial Co., Taipei Cotton Textile Co., Jong Bang Textile Co., Chinese Agricultural Import & Export Co., Chinese Farmers' Chemical Co., Postal Savings & Remittance Board, Taiwan Warehouse Co., Taiwan Life Insurance Co., Taiwan Fire & Marine Ins. Co.

### *U.S. Investors*

American firms with investments and/or licensing agreements in Taiwan include:

Allied Chemical Corp., American Cyanamid Co., American-Saint Gobain Corp., Atlas Chemical Industries, Inc., Carter Products G. S. Inc., Celanese Corp. of America, Chemtex Inc., Cluett, Peabody & Co., Inc., Clupak, Inc., Continental Can Co., Inc., Dorr-Oliver Inc., EKCO Products Co., Eli Lilly & Co., Fentron Industries Inc., Foremost Dairies, General Electric Co., General Instrument Corp., Gulf Oil Corp., International Engineering Corp., Intrusion Prepakt, Inc., Louis Marx & Co., Meehanite Metal Corp., National Distillers & Chemical Corp., Nylonge Corp., Olin Mathieson Chemical Corp., Pfizer Pharmaceutical Corp. Ltd., Philco Corp., Pittsburgh Plate Glass Co., Procter & Gamble, A. G. Lucerne, Richard Hudnut, The Singer Co., Sino-American Milk Products of America, Inc., Socony Mobil Oil Co., Inc., Standard Laboratories Inc., Struthers Wells Int'l Corp., TIM Corp, Int'l, Vick Chemical Co., Von Kohorn International Corp., Warner-Lambert Pharmaceutical Co., Western Elec. Co., Inc., Westinghouse Elec. Int'l Co., Willys-Overland Export Corp., World Homes Inc.

## *Shipping Lines Serving Taiwan*

| Lines                                     | Services   | Agents   |
|---|--|--|
| American Export Isbrandt-sen Lines, Inc.  | Round-world service from U.S. East Coast, Barcelona, Genoa, Beirut, Karachi, Singapore, Hong Kong to Pusan, Kobe, Nagoya, Shimizu Yokohama, U.S. West Coast, Puerto Rico and U.S. East Coast | Allied Transportation & Trading Corp., 2nd Floor, 36-1 Chungshan North Rd., Sec. 2, Taipei. Tel: 58685-6 |
| American Pioneer Line (U.S. Lines)        | Weekly service from/to U.S. East Coast with occasional calls at Honolulu   | Jardine, Matheson & Co. Ltd., 36 Kwei Teh St., Taipei. Tel: 43521-3, 49193, 40282                        |
| American President Lines                  | Trans-Pacific service, three sailings from/to Keelung, Kaohsiung, Japan, San Francisco, Los Angeles and San Diego  | Getz Bros. & Co., Inc. 124 Nan-king East Rd., Sec. 1, Taipei. Tel: 48673-6                               |
| China Merchants Steam Navigation Co. Ltd. | Regular calls at U.S. Pacific, Atlanta and Gulf ports, Okinawa, Japan, Korea, Philippines, Malaya and Thailand   | China Merchants Steam Navigation Co. Ltd., 46 Kuan Chien Rd., Taipei. Tel: 55231-5                       |
| China Union Lines Ltd.                    | Worldwide excluding Communist ports  | China Union Lines Ltd., 46 Kuan Chien Road, Taipei. Tel: 37521   |
| Dominion Far East Line                    | Regular monthly service to/from Australia. Also load for Guam  | Jardine, Matheson & Co. Ltd.   |
| Messageries Maritimes Nedlloyd Lines      | Monthly service between Keelung and Europe<br>Monthly service from/to Kaohsiung, Keelung, Japan, Aden, Beirut, Hamburg, Bremen, Amsterdam, Antwerp, Barcelona                                | Jardine, Matheson & Co. Ltd.<br>Getz Bros. & Co., Inc.   |
| Orient Overseas Line                      | Passenger and cargo service to U.S.A. and Europe   | Chinese Maritime Trust Ltd., 42 Hsuehchang Street, Taipei. Tel: 20576-8                                  |
| Pacific Far East Line, Inc.               | Monthly service to Inchon, Pusan, San Francisco, Los Angeles   | Taiwan Trading Corp., 103 Chungshan North Rd., Sec. 2, Taipei. Tel: 43044, 48284-7                       |
| States Marine Lines (U.S. flag)           | Regular service from/to West, East and Gulf Coasts, U.S.A. and irregular service to Vietnam  | Taiwan Maritime Co. Ltd., 2 Chang An East Rd., Sec. 1, Taipei. Tel: 47762-3                              |
| States Steamship Company                  | Two sailings monthly from/to Keelung, Kaohsiung, Japan, Vancouver, Seattle, Longview, Tacoma, Portland   | Getz Bros. & Co., Inc.   |

### STANDARDS

#### *Weights and Measures*

Both metric and Chinese weights and measures are used in Taiwan. Official data use the metric system, while individuals, particularly farmers and retailers, use the Chinese system. Following are the more commonly used weights and measures converted to U.S. standards.

#### Length

##### *Metric to English*

- 1 millimeter=0.039 inch
- 1 centimeter=0.394 inch
- 1 meter=3.28 feet
- 1 kilometer=0.621 mile

#### *Chinese to English*

- 1 shih chih=1.094 feet
- 1 shih li=0.311 miles

#### Area

##### *Metric to English*

- 1 square meter=10.764 square feet
- 1 are=1,076.386 square feet
- 1 hectare=2.471 acres
- 1 square kilometer=0.386 square miles

#### *Chinese to English*

- 1 square shih chih=1.195 square feet
- 1 shih mow=0.1647 acre

## Weight

### *Metric to English*

- 1 gram=0.035 ounce  
1 kilogram=2.205 pounds  
1 metric ton=2,205 pounds  
(1,000 Kilograms)=1.102 tons  
=0.984 long ton

### *Chinese to English*

- 1 shih catty=1.102 pounds  
(500 grams)  
1 Taiwan catty=1.333 pound  
(600 grams)  
1 picul=110.231 pounds  
(100 shih catties)

## Volume and Capacity

### *Metric to English*

- 1 liter=0.220 British gallon  
=0.264 U.S. gallon  
1 cubic meter=35.314 cubic feet  
=1.308 cubic yards

### *Chinese to English*

- 1 shih sheng=0.264 U.S. gallon  
(1 liter) liquid measure  
1 cubic shih chih=1.308 cubic feet

## Electricity

Taiwan's electricity runs on a.c. (alternating current), 60-cycle, 1,3 phases, 100/200 nominal voltage. Voltages commonly used in factories are: for lighting, 110v or 220v; for powering motors, 330v, 380v, or 220v; for welding, 220v; for furnaces, 3300v; and for heaters, 220v.

Electrical wiring standards are established by the Ministry of Economic Affairs and enforced by the Taiwan Power Company. Copies of the "*Outdoor Wiring Regulations*" and "*Indoor Wiring Regulations*" are not available in English. In practice, Taiwan's wiring standards are similar to Japan's, but are compatible with U.S. wire and cable.

Electrical and dimensional standards for motors and transformers follow the Chinese National Standards (CNS), established by the Bureau of Standards of the Ministry of Economic Affairs. U.S. electrical machinery is fully compatible.

## Government Organizations

### Taipei Customs

Harbor-Building, Keelung, Taiwan  
Tel.: 629 Keelung

### Tainan Customs

Peng Lai Rd., Kaohsiung, Taiwan  
Tel.: 53251 Kaohsiung

### Taiwan Provincial Government

Chung Hsing Village, Nantou Hsien, Taiwan  
Tel.: 1555, 1556, 1562, 172, 173 Taichung  
Taipei Office: Chung Cheng Rd., Taipei, Taiwan  
Tel.: 23401-09, 29311-15, 29411-15

### Water Conservancy Bureau, Department of Reconstruction

Ching Tao E. Rd., Taipei, Taiwan  
Tel.: 26158, 28524

### Public Works Bureau, Department of Reconstruction

Ching Tao E. Rd., Taipei, Taiwan  
Tel.: 25672

### Taiwan Forest Administration

2 Hang Chow S. Rd., Sec. 1, Taipei, Taiwan  
Tel.: 26611

### Bureau of Commodity Inspection & Quarantine

5 Chung Shan S. Rd., Taipei, Taiwan  
Tel.: 23203, 23204

Taichung Office: 120 Shia Chiao Tou, S. Dist., Taichung City

Kaohsiung Office: 50 Hai Pien Rd., Kaohsiung City

Tainan Office: 1 Chung Shan Rd., Tainan City

Keelung Office: Harbor Building, Keelung City

Hsinchu Office: 73 Min Chu Rd., Hsinchu City

Hwalien Office: 28 Hsi Yuan St., Hwalien City

### Fishery Administration, Department of Agriculture & Forestry

1688 Chung Cheng Rd., Taipei, Taiwan  
Tel.: 28363, 24143

### Taiwan Supply Bureau

1581 Chung Cheng Rd., Taipei, Taiwan  
Tel.: 31051-4, 31006-7

### Taiwan Food Bureau

15 Hang Chow S. Rd., Sec. 1, Taipei, Taiwan  
Tel.: 24402-3

### Taiwan Coal Supply Adjustment Committee

71 Kun Ming St., Taipei, Taiwan  
Tel.: 33531

### Kaohsiung Harbor Bureau

Pin Hai Rd., Kaohsiung, Taiwan  
Tel.: 53231 Kaohsiung

### Ministry of Interior

107, Roosevelt Rd., Sec. 4, Taipei, Taiwan  
Tel.: 25803

### Ministry of Foreign Affairs

162, Po Ai Rd., Taipei, Taiwan  
Tel.: 29291

**Ministry of Finance**

1, Nan Chang St., Sec. 1, Taipei, Taiwan  
Tel.: 24726

**Ministry of Education**

11, Chung Shan S. Rd., Taipei, Taiwan  
Tel.: 26851

**Ministry of Economic Affairs**

15, Foo Chow St., Taipei, Taiwan  
Tel.: 23703

**Ministry of Communications**

2, Chang Sha St., Taipei, Taiwan  
Tel.: 23901

**Government Information Office**

1709, Chung Cheng Rd., Taipei, Taiwan  
Tel.: 39531

**Overseas Affairs Commission**

1, Chung Shan N. Rd., Sec. 1, Taipei, Taiwan  
Tel.: 27936

**Joint Commission on Rural Reconstruction**

25, Nan Hai Rd., Taipei, Taiwan  
Tel.: 28711

**Council for International Economic Cooperation and Development, Executive Yuan**

118, Hwai Ning St., Taipei, Taiwan  
Tel.: 24840

**Industrial Development & Investment Center, CIECD**

58, Chung Shan N. Rd., Sec. 2, Taipei, Taiwan  
Tel.: 46891-2

**Office of Technical Cooperation, CIECD**

118, Hwai Ning St., Taipei, Taiwan  
Tel.: 25397, 24135

**Foreign Exchange & Trade Commission, Executive Yuan**

Nan Chang St., Sec. 1, Taipei, Taiwan  
Tel.: 23836, 25842

**National Bureau of Standard, MOEA**

1 Lane 1, Cheng Kung Rd., Tainan, Taiwan  
Tel.: 4106 Tainan

**Customs Administration, Ministry of Finance**

48, Cheng Chow Rd., Taipei, Taiwan  
Tel.: 542501  
The 10th Pier, Kaohsiung, Taiwan  
Tel.: 54359 Kaohsiung

**Keelung Harbor Bureau**

Harbor Building, Keelung, Taiwan  
Tel.: 901 Keelung

**Keelung Harbor Bureau, Wharf & Warehouse Administration**

Tel.: 675 Keelung

**Hwaiien Harbor Bureau**

Harbor Building, Hwaiien City, Taiwan  
Tel.: 358 Hwaiien

**Hsien/City Industrial Development & Investment Promotion Committees in Taiwan**

Taipei Hsien, Keelung City, Tao Yuan Hsien, Hsinchu Hsien, Taichung City, Taichung Hsien, Changhwa Hsien, Tainan Hsien, Kaohsiung Hsien, Hwaiien Hsien, Kaohsiung City, Ilan Hsien, Pingtung Hsien, Yunlin Hsien, Chiayi Hsien

**United States Embassy**

1842, Chung Cheng Rd., Taipei, Taiwan  
Republic of China

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*Bi-Monthly Economic Review*, Bank of China.

*Foreign Exchange and Trade Handbook*, Foreign Exchange and Trade Commission, 1966.

*Fourth Four Year Plan for Economic Development of the Province of Taiwan, 1965-1968*, Council for International Economic Cooperation and Development.

*Industry of Free China* (monthly), Executive Yuan.

*Investment Feasibility Surveys* (series), Industrial Development and Investment Center.

*Statute for Encouragement of Investment, Statute for Investment by Foreign Nationals, and Questions and Answers about Investment Laws of the Republic of China*, Industrial Development and Investment Center.

*Taiwan Statistical Data Book 1966*, Council for International Economic Cooperation and Development.

**U.S. Government**

*Aids to Business (Overseas Investment)*, Agency for International Development.

*Index: Catalog of Investment Information and Opportunities*, Agency for International Development.

*International Commerce* (weekly), Department of Commerce.

*Labor Law and Practice in Taiwan (Formosa)*, Department of Labor.

*Overseas Business Reports*, Department of Commerce.

*Taiwan Trade Mission Report*, May 24, 1965 issue,

*International Commerce*, Department of Commerce.

**Non-Government**

*China Post* (daily newspaper), Taipei.

*China Yearbook*, China Publishing Co., Taipei.

*Far Eastern Economic Review* (weekly), Hong Kong.

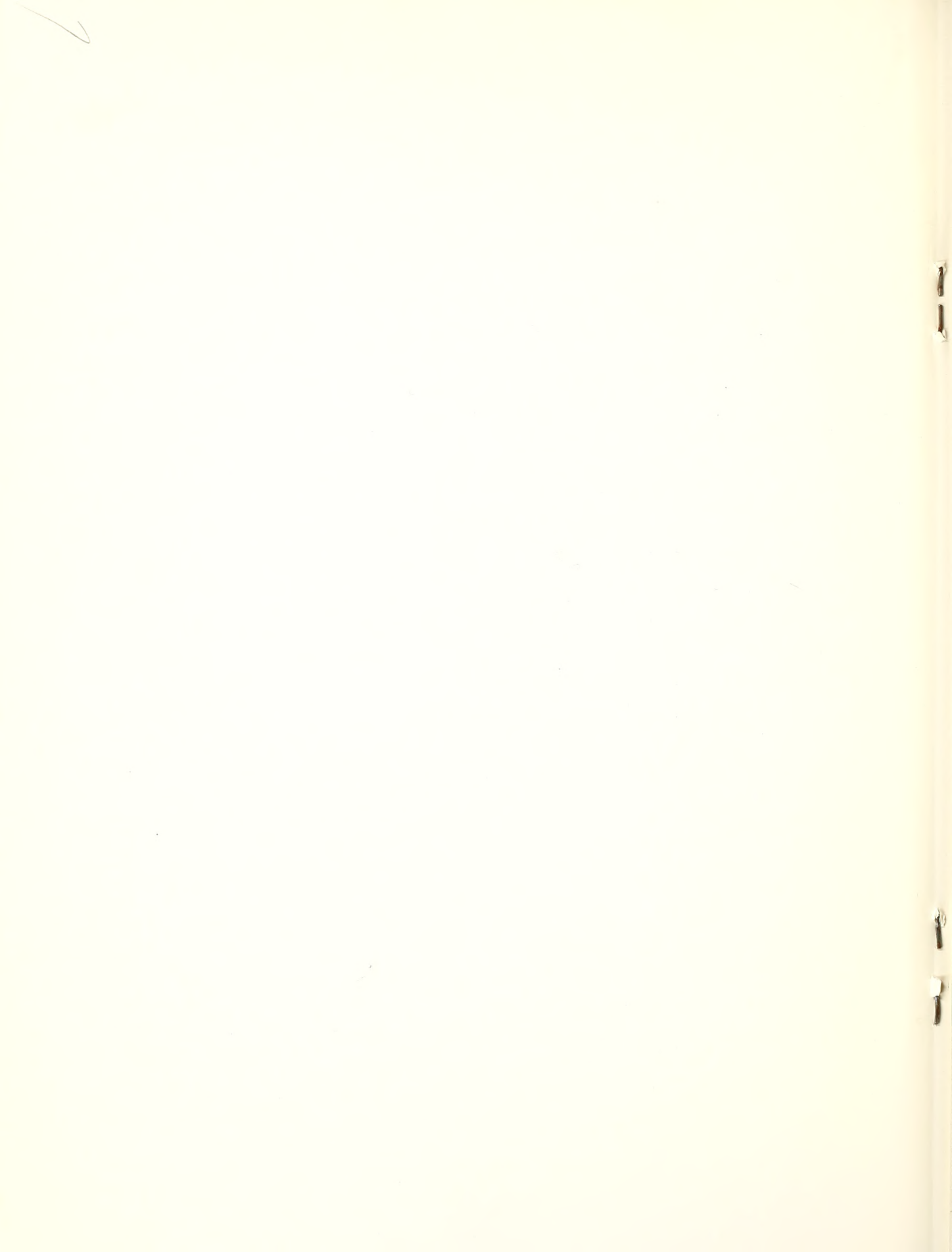
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*Taiwan Trade Monthly* (monthly), Epoch Publicity Agency, Taipei.









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